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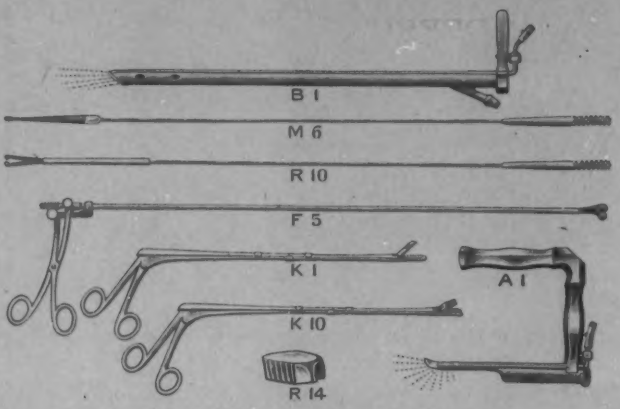

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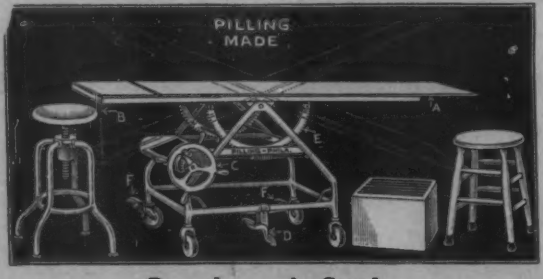

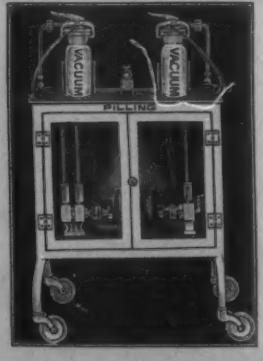

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THE

LARYNGOSCOPE.

VOL. XL DECEMBER, 1930. No. 12

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

THE ANESTHETIC PROBLEM IN OTOLARYNGOLOGY.*

DR. ROBERT LEVY, Denver.

At the Lister Centenary Celebration, held in Glasgow, April 1, 1927, Sir George Beatson in speaking of those men who stood out most prominently in the nineteenth century named Sir James Young Simpson, Louis Pasteur and Lord Lister as the "great triumvirate to whom surgery owes its two greatest discoveries, anesthesia and antiseptic surgery."

Our specialty, like all other departments of surgery, has profited in untold degree by the discovery of anesthesia. No attempt will be made here to present a dissertation upon anesthesia, nor is any apology needed for discussing the subject at this time; the problems connected with both local and general anesthesia concern all of us all the time. True, each one of us may have his favorite method; whether his choice be in favor of general or local anesthesia, few have maintained firm convictions covering a period of years without being obliged to alter these convictions as their experience increases, leaving a period of uncertainty or of doubt as to which is best.

The story of anesthesia, the discovery of different anesthetics, is interesting and fascinating. The early controversies that took place in the profession after the advent of ether (Long, 1842; Morton,

*Read before the American Laryngological, Rhinological and Otological Society, Midwestern Section, Jan. 23, 1930.

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1846), and chloroform (Simpson, 1847), and those between local and general since the discovery of cocain (Koller, 1884), are within the recollection of many of the older members of the profession. No one can say that all of these controversies are even now definitely settled. Those of us who were practicing medicine during the period immediately following the discovery of the anesthetic properties of cocain can testify to the avidity with which our specialty, quite particularly, accepted it. And as for the problems concerning the choice of chloroform, ether or gas, and combinations of these, such as the ACE mixture (alcohol one part, chloroform two parts, ether three parts), these are not as yet entirely settled, although investigations carried on by the Special Chloroform Committee of the British Medical Association (1901-1904) confirmed the British in their choice of chloroform. In this country ether has by a large majority the preference.

Special regions present special problems, incident to the peculiarity of their respective operations and the determination of the anesthetic to be used and its subsequent development is often dependent upon the extent of its employment. For example, certain special anesthetics and special methods of using them often appear upon the surface as being peculiarly adaptable to our specialty, but because of insufficient experience with or cultivation of these methods they have not been accepted. Take, for example, the colonic method of administering ether. In some respects this would seem ideal for some of our operations but, except in occasional sporadic instances, it is not even thought of. Then, again, the method of intrapharyngeal or tracheal insufflation anesthesia so successfully used in goitre operations, insofar as I know, is rarely employed by otolaryngologists here except in the performance of an intralaryngeal operation. In choosing a general anesthetic we make too seldom use of nitrous oxid and the gas-oxygen method, especially gas-oxygen induction.

The various arguments for and against the different general anesthetics need not be discussed here, but if there is any one outstanding rule, a rule which should be applied to the administration of all general anesthetics, it is that the proficiency of the anesthetist and his experience in our special field should be beyond question. If the operation is a nasal, a sinus, a tonsil, or a mastoid, the anesthetist should be able to cope with the special difficulties that present themselves; to prevent blood inspiration, to maintain quiet breathing, to insure continuous anesthesia in spite of the necessity of removing the anesthetic from time to time, to observe constant watchfulness for injury to the facial nerve; these are a few of the duties that are

added to those of the anesthetist. I can conceive of no surgical procedure in which teamwork on the part of the surgeon and the anesthetist is of more importance than in some of our operations.

In the choice of anesthetics the history of previous operations and the effects of local or general anesthesia is not always reliable, for, as Emil Mayer told us in that splendid report on local anesthesia, there are times when the patient's physical condition may be below par and, therefore, his susceptibility greater.

Some operators are inclined to allow the patient himself to make the choice. We should remember that this is rarely dependable or desirable. In choosing between local and general, patients of the neurotic type present special problems. The importance of the nervous dread of an operation shold not be underestimated, even though pain may be entirely eliminated. Anxiety and fear characterize patients of high sensibility and this fear may be increased to the extent of producing a subsequently "traumatic neurosis" in psychopathic patients should they see or hear something that may appear to them alarming or unfavorable during the surgical procedure. Therefore, it would seem that patients of this type are particularly poor subjects for the use of local anesthetics. True, much of this psychic influence may be eliminated by administering prior to the operation morphin or morphin and hyoscin. It is routine with me in all tonsil operations under local anesthesia, and almost routine in all others, to administer one or two doses of hyoscin, morphin and cactin; so-called H.M.C. Shortly after the advocacy of "twilight sleep" in obstetrics I saw this method applied in Bloch's Ear Clinic in Freiberg. At that time instead of using hyoscin we were using scopolamin. For several years I used this in special cases, such as suspension laryngoscopy or while removing the epiglottis for tuberculosis, until a sudden death so discouraged me that several years elapsed before I took it up again. It is quite likely that the unstandardized scopolamin was a factor which has today been almost completely eliminated, if not entirely, by the use of hyoscin. The remedy, however, is not without its unpleasant effects; certain cases are peculiarly susceptible to hyoscin and morphin and an excitability to the extent of delirium is manifested. The quieting effect of the remedy, therefore, is replaced by the exaggerated mental excitement, the very thing we are trying to overcome. To those who have had this experience it is unnecessary to say that it is one of the most unpleasant, even though only temporary. I do not believe this remedy should be used in old individuals except after the most careful physical examination as to the state of the cardiovascular and

nervous systems. At the same time we remember that many believe that old individuals do not take general anesthetics well and so this often becomes a good deal of a problem.

Generally speaking, H.M.C. may be given in two doses, the first consisting of morphin ¼ gr. and hyoscin 1/100 gr. 45 minutes before the operation and the second dose 20 minutes later, consisting of morphin ⅛ gr. and hyoscin 1/200 gr. It is always wise to have the patient carefully watched following the first dose and to omit the second if he is profoundly affected by the first. Much can be done towards insuring the best effect of this method by keeping the patient perfectly quiet, having no disturbing noises, and bringing him into a darkened operating room with as little exertion on his part as possible.

A problem in the choice of local or general anesthesia in tonsil operations is that of bleeding. It is believed that primary hemorrhage can be much more readily located under general than under local, for not only does the adrenalin, which is uniformly present, prevent bleeding at the time, but edema from infiltration often obscures the point of hemorrhage. Moreover, delayed primary hemorrhage, that which occurs anywhere from three to twelve hours after the operation, is much more frequent following local than following general anesthesia.

The question of pulmonary abscess following tonsillectomies and its development following general or local has been the source of more or less study by a number of men. J. Leslie Davis, who is a firm adherent of general anesthesia in tonsil operations, stated that recent researches in the field of pulmonary complications may develop without regard to whether general or local anesthesia is used or even without any anesthetic, and Iglauer in a comprehensive study of the various theories for the development of lung abscess, showed that aspirated blood was found in the trachea and main bronchi in at least 40 per cent in all cases under general anesthesia and in the trachea of 38 per cent of those done under local anesthesia. Incidently, it may be here mentioned that Iglauer evidently believes that aspiration of the infected material is responsible for the majority of these abscesses. If this is true there does not seem to be very much choice between local and general.

Tonsillectomy under a local anesthetic is ideal where everything is working well, where H.M.C. and the novocain have the desired effect, quieting the patient, preventing all pain, abolishing reflexes, minimizing primary hemorrhage, and the operator has not been obliged to exhaust himself in an attempt to produce *vocal* anesthesia

instead of *local*, and where certain distressing recollections do not remain with the patient.

The advent of cocain and allied remedies for operations in the nose and accessory sinuses, not to speak of many minor procedures that cannot be dignified by the term operation, has revolutionized rhinologic practice, and when to these anesthetics we add the ischemic action of adrenalin (1901), these operations appear as perfect procedures. Nevertheless, we are compelled to admit that there are certain grave considerations which if carelessly regarded lead to disastrous results. Serious constitutional disease, as indicated by Mayer's report, is a warning for the exercise of the greatest of care. I feel that children are exceptionally dangerous subjects, notwithstanding the frequency with which they are operated upon under local anesthesia.

General anesthesia in children also presents dangers, one of them being status lymphaticus, a condition which is to be feared because of the sudden death and because of our lack of definite knowledge concerning its pathology and its recognition. Perhaps the study of Anderson and Cameron, in the *Glasgow Medical Journal* of September, 1927, in which 100 cases were reviewed, gives us the most enlightening information. These authors state that this pathological picture, which they term "lymphatism", "represents an unhappy combination of factors which leaves its subjects liable to death from trivial causes, whether anesthetic or emotional." They believe the cause of death to be due to a fall of blood pressure from diminished adrenalin. The recognition of this condition appears to be rather uncertain. There is something in the general appearance of a lymphatic child that arouses one's suspicion at first glance. One should be constantly on guard. Anderson and Cameron characterize these children as the "angelic type of child," or the one of pasty complexion, of much subcutaneous fat, with dry hair, who shows on examination high-arched palate, dull muffled heart sounds, lymphocytosis, enlarged glands, including the thymus, which may be determined by percussion or X-ray examination. The few suspected cases coming under my observation have been checked by X-ray and have been given a course of X-ray treatment. Whether this was of material benefit or not I cannot say, except that subsequent operation was successfully performed.

In the use of local anesthetics certain routine precautions should always be undertaken. Cocain should never be used subcutaneously. All preparations, whether cocain to be applied upon the surface or novocain to be used subcutaneously, should be freshly prepared and

the exact quantity furnished the operator noted. Separate and easily distinguishable containers should be used for cocain, novocain and adrenalin. These containers should be of different color or, if you choose, the solutions may be colored. The methods of using them vary with different operators, some use blocking, others infiltration, and others the mere application to the surface of the mucous membrane. In septal and sinus operations the dosage of cocain is far from standardized. Three-tenths of a grain has produced serious effects, while recovery has taken place after administering 32 gr.

The introduction of the local anesthetic into a vein is 10 times more dangerous than when introduced subcutaneously, which probably accounts for some of the sudden deaths. Hirsch makes the statement that this is due to the longer period of absorption subcutaneously and the lesser concentration before the strength is manifest on the central nervous system. Some claim that when applied on the surface the stronger solution is safer because the vasoconstrictor effect diminishes the amount of drug absorbed. There is no need of depending upon the anesthetic for this ischemia. It is our routine practice thoroughly to paint the mucous membrane prior to the application of cocain with adrenalin. Moreover, weak solutions may often be depended upon for thorough anesthesia, providing sufficient time is allowed to elapse before operating. In septum operations the use of 20 per cent solutions was the common practice some years ago. One may obtain perfect anesthesia with 10 per cent if properly applied and sufficient time is allowed, eight to 10 minutes being the maximum. One should make it a rule to use the weakest solution possible, even though a few more minutes is required. True, there are a few men who still use the pure cocain with a little adrenalin, the so-called mud. One cannot condemn this practice in the light of their successful experience, but that unnecessary risk is thereby taken seems to me must be conceded.

Solutions of cocain applied in the nose need not be stronger than 10 per cent, in the pharynx no stronger than 5 per cent in the larynx one may use with perfect safety 20 per cent. Even in the case of children, strong solutions in the larynx seem to be tolerated. In attempting to remove laryngeal papillomata in children by the indirect methods my experience covers the ages 11 to 16. I recall using a 20 per cent solution on a child age 16 years without producing the necessary anesthesia for intralaryngeal manipulation and I was obliged to resort to general anesthesia. In another child, age 11 years, 6 c.c. of a 10 per cent solution, representing 9 gr., were used with satisfactory anesthesia for a short operation. It is rec-

ommended that where it is deemed necessary or desirable to use cocain in children one attempt to establish the susceptibility of the child by beginning with a very low percentage, increasing at daily sittings until the desired anesthesia is obtained.

The use of other drugs to supplement the action of cocain is too large a subject for discussion here and in some instances is still in the experimental stage. The combination of adrenalin and cocain is favored by many for obvious reasons, more particularly for the saving of time. It is suggested, however, that combinations of drugs in all therapeutics are often attended with uncertainty as to the relative effects of each and therefore it is believed that cocain and adrenalin should be used separately, one preceding or following the other.

The question has been raised and a fear has been thrown into us as to the use of adrenalin during general anesthesia. Chloroform has an especial affinity for the adrenals; so far as I know this has not been determined of ether. It is also stated that adrenalin may be used during deep anesthesia but not during light anesthesia. It is said to regularize narcosis and diminish postoperative shock. What particular bearing this has upon our field is obvious, especially when we consider that in radical mastoid operations and radical sinus operations, where the anesthesia is begun before the adrenalin can be applied, adrenalin is used *ad libitum* and so far as I know and so far as my experience goes, without any ill effect. The recent use of barbituric products prior to local or general anesthesia is attracting considerable attention. Barlow and Williams believe that they neutralize the toxic effect of cocain and novocain. Their ill effects seem negligible.

The technique of local as well as general anesthesia in the different otolaryngologic operations is as varied as the personal predilection of the mass of operators and therefore no attempt is here made to inflict upon you the writer's personal preferences in specific detail.

Metropolitan Building.

A PLEA FOR THE MORE FREQUENT USE OF LOCAL ANESTHESIA IN MASTOIDECTOMY.*

DR. LESTER MEAD HUBBY, New York.

There seems to be a tendency to avoid doing mastoid operations under local anesthesia even in poor surgical risks.

In fact, many of the textbooks on otology either fail to mention the procedure or give it scant description.

Nevertheless, the technique is simple and the results are usually brilliant.

It has been used more or less for nearly 30 years, first in simple mastoidectomy and later in the radical operation.

The technique has been gradually improved by such men as Alexander, Heinrich Braun, Neumann, von Eichen, Laval, Gomperz, J. J. King and others.

Indications and contraindications.

In general, it should be used in most poor surgical risks where mastoidectomy has to be done.

Diabetes, cardiacs where there is a tendency to decompensation, nephritis, advanced age, infants with malnutrition or marasmus or other conditions where a long operation would not be tolerated.

It should not be used in subperiosteal abscesses on account of the danger of spreading the infection to other parts.

The radical mastoid operation is seldom indicated except in cases with severe complications.

Preliminary drug medication.

Many methods have been advocated but in this short paper I will confine myself to the method that I have found satisfactory

Mastoidectomy, under local anesthesia alone, is exceedingly disagreeable, especially when the mallet and chisel are used. Of course the latter can be avoided by employing the Hudson drill, followed by rongeurs and curettes.

Fortunately, it is possible to dull the perception of pain with morphin and to obtund the cerebral centers with scopolamin.

These drugs together usually produce considerable drowsiness and the scopolamin has the power to cause forgetfulness of any pain felt during the operation.

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*Read before New York Academy of Medicine, Section on Otology. May 9, 1930.

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The pulse and respiration must be taken before each injection of the morphin and scopolamin and before beginning the operation, and should also be closely watched during the operation. If the pulse becomes too fast or too weak, caffein may be used, and should the respiration be slowed, strychnin is the proper drug.

It is rarely necessary to give either of these.

Some errors have been committed in the measuring of the scopolamin by nurses. It is therefore wise to have tablets or ampoules of the exact doses to be employed, thus avoiding errors in mental arithmetic.

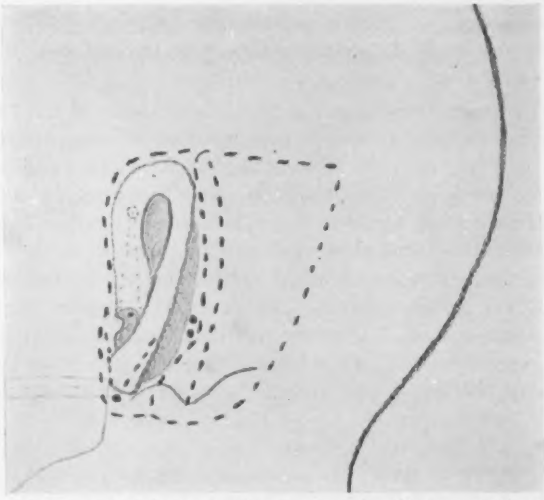

Diagram of the parts injected in the simple and radical mastoid operation.

One hour before the operation, morphin gr. 1/10-1/8 and scopolamin. gr. 1/300-1/200, depending on the size and robustness of the patient, are given to an adult and repeated half an hour later if there is no slowing effect on the respiration, too great increase in pulse rate, marked drowsiness or other untoward symptom.

The patient should be kept mentally and physically quiet until the operation. There should be no talking; rest in bed, and the patient should be carried on a stretcher to the operating room.

Patients who are in precarious conditions or where consciousness is obtunded may get along well without or with reduced preliminary medication.

Infants may be given morphin gr. 1/100 half an hour before operation, omitting the scopolamin.

Cardionephritics should be given minimal doses of morphin and scopolamin, or omit them entirely.

Before adopting a technique it is necessary to consider the sensory nerves supplying the parts near the ear.

1. The lesser occipital nerve from the second and third cervical nerves approaches the mastoid just posterior to the attachment of the sternocleidomastoid muscle and in several twigs.

It supplies the soft tissues over the mastoid and the upper part of the medial surface of the auricle. This can be blocked by several deep injections along the lower and posterior margin of the mastoid opposite the external auditory meatus and about 4 c.m. from the latter.

2. The great auricular nerve from the second and third cervical nerves approaches the mastoid just anterior to the sternocleidomastoid muscle and supplies most of the medial surface and parts of the lateral surface of the auricle, as well as some of the soft parts just posterior to the auricle. It can be blocked by rather deep injections just anterior and close to the mastoid tip.

3. The auriculotemporal nerve (branch of the trigeminus) supplies the tragus, the ascending part of the helix, upper part of the lateral surface of the auricle and external auditory canal, and the upper external surface of the drum. This can be blocked by injections along the upper and anterior parts of the external auditory canal.

4. The auricular branch of the vagus (Arnold's nerve) supplies the external lower surface of the drum and lower and posterior part of the external auditory canal. This can be blocked by injections along the lower and posterior parts of the external auditory canal.

5. The tympanic plexus, containing the tympanic branch of the glossopharyngeal nerve, supplies the tympanum, aditus, antrum, mastoid air cells and the tympanic end of the Eustachian tube.

6. The nervus spinosis branch of the mandibular nerve may send a twig to the mastoid air cells.

These last two nerves can be anesthetized by topical applications.

Novocain 1 per cent solution is used in adults, and 0.5 per cent solution in infants and young children.

1. The Simple Mastoid: The skin and deep soft tissues should be injected well beyond the field of operation, so that pulling and retracting will not be painful.

First inject into the skin encircling the entire mastoid field, beginning 3 c.m. below the mastoid tip, then inject the skin along the planned mastoid incision.

Now make deep injections over the entire field, both above and under the periosteum, particularly at the lower margin of the mastoid so as to block the great auricular nerve near the mastoid tip, and the branches of the lesser occipital nerve from the tip backward.

Two deep and subperiosteal injections are made posterior to the auricle near the external auditory meatus, about 1 c.m. into the osseus meatus. This is the most difficult area to anesthetize.

The radical mastoidectomy is here described for completeness, although I have not yet used the method.

Make the initial intradermal injections encircle the entire operative field, extending in a line 1 c.m. anterior to the auricle, 1 c.m. above the limit of your posterior incision, 1 c.m. posterior to operative bony field and 3 c.m. below mastoid tip.

Make a second intradermal injection along the line of your planned incision.

Make deep and subperiosteal injections same as in the simple mastoidectomy.

Make injections into the tissues surrounding the external auditory canal nearly to the tympanic ring. This is done by injecting upward, inward, forward and backward from a point just in front of the tip of the mastoid; and downward, inward, forward and backward from a point 1 c.m. above the attachment of the auricle.

Neumann's injection into the upper wall of the external auditory meatus to the tympanum is then made.

The tympanum, aditus and antrum are anesthetized by drops into the tympanum of 10 per cent cocain, and the tympanic end of the Eustachian tube by passing a thin bent applicator covered with a little cotton and soaked in Bonain's 33⅓ per cent cocain solution into the Eustachian tube and allowing it to remain *in situ* for 15 minutes while proceeding with the operation on the mastoid.

In conclusion, it is necessary to use the greatest possible gentleness, put the patient in as comfortable a position as possible, reassure him and warn him when you have to be rough or make a noise with the chisel or rongeur, avoid the chisel as much as possible and watch carefully the condition of the circulation and respiration throughout the operation.

620 Park Avenue.

VASOMOTOR RHINITIS.*

DR. JOEL J. PRESSMAN, Philadelphia.

The diagnosis and treatment of vasomotor rhinitis has been most unsatisfactory because of our inability to correctly classify the pathology and correlate these changes with our clinical findings.

We are familiar with certain changes which take place in the mucous membrane of the nose leading to turgescence and rhinorrhea to which we give the name vasomotor rhinitis. It is generally accepted that the mechanism involved probably takes place through the sympathetic nervous system.[1 2] At this point the extent of our knowledge of the physiology terminates abruptly. We have assumed that the particular end-organ involved is the vascular supply of the nasal mucous membrane, hence the adoption of the term vasomotor. In point of fact there is much to indicate that this conception may be entirely wrong, for as often as not pathological studies reveal no changes in the calibre of the vessels.[3 4] We frequently, on the other hand, see dilatation of the glands[3 5] and it may be that the condition is glandulomotor since the mucous glands are likewise supplied with sympathetic fibres.[1 2 6] Another new concept is that the marked edema which takes place in the tissues may conceivably be due to an exudation from the lymph vessels, which are similarly supplied by the sympathetic[6] and the condition be one of lymphaticomotor rhinitis. None of these possibilities has ever been proven and the vasomotor origin of this condition is no more likely than either of the other two. We are therefore not justified in our present state of knowledge in using the term vasomotor rhinitis and I would suggest that we limit our terminology to the use of such descriptive terms as the extent of our knowledge of the pathology and physiology permit.

We know that in practically all of the cases which we include in this group, turgescence is a constant factor, and likewise rhinorrhea, so that it would be logical, for the time being at least, to designate the syndrome under discussion as "turgescent rhinorrhea", and it shall be so designated in the remainder of this presentation. Such a term applies equally well regardless of the etiology. I may point out, to avoid misunderstanding, that I use this term as a synonym for vasomotor rhinitis, believing it to be the more correct usage.

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*Read before the Philadelphia Laryngological Society, May 6, 1930.

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For purposes of this discussion we can consider that turgescent rhinorrhea is the result of either one of two etiologic factors, allergic and nonallergic, and the successful treatment of any given case depends entirely upon our ability to determine which of these two is the cause of the condition. The local nonallergic causative factors are chiefly anatomical nasal abnormalities, such as deviated septa, localized hypertrophies and hyperplasias and inflammatory diseases of the nasal accessory sinuses. It is unfortunate that the allergic state and other nasal pathology just enumerated so frequently accompany one another, for it is the coexistence of these two etiologic groups that is misleading, and it is only by the most careful detailed clinical and pathological study that we are able to know which of these represents the primary and basic etiologic factor of the turgescent rhinorrhea, since each may be either the cause or effect of the other. In the presence, for instance of a suppurating sinus and a turgescent rhinorrhea, how are we to know from a clinical examination whether an allergic rhinitis has been the starting point of the sinus infection or whether the sinus infection itself is primary?

Even a therapeutic trial with apparently convincing results is not always a satisfactory criterion of etiology. We have frequently heard case reports in which a supposed turgescent rhinorrhea was cured as the direct result of drainage of a diseased sinus, and the supposedly logical conclusion drawn that, having disappeared with the cure of the suppuration, the turgescent rhinorrhea was in this case due to the infection in the particular sinus involved. Such conclusion, however, is never warranted in so far as etiology is concerned and even though apparent cure has resulted from surgical drainage, allergy has not been ruled out. This state of affairs can be logically compared to a case of diabetes complicated by gangrene of an extremity or a carbuncle of the neck. Incision of the carbuncle or amputation of the involved extremity results in marked improvement of the diabetes, but all of us will agree that diabetes is never due to gangrene of the leg, or a carbuncle, and yet improvement in the primary disease (turgescent rhinorrhea in our case) has resulted from successful treatment of a secondary complication. It is clear, therefore, that we cannot base our classification of etiology on the results obtained from therapeutic measures. It is to be expected that the progress of an allergic state, as well as many other pathological entities, will be held in abeyance by the eradication of a focus of infection or irritation; but this by no means indicates that the infection or irritative focus played a primary role in the etiology. This improvement in the general condition of the patient is often of short

duration and if allergy lies in the background, the cure of a turgescent rhinorrhea will almost never be complete or permanent, as a result of the elimination of a complciating factor such as a suppurating sinus.[7 8]

The converse is likewise true, and even though improvement may result from desensitization of an allergic individual, a contributing local cause may similarly play an etiologic role.

Recently, through the work of Finck[3] and Hansel[5], we have learned much about the pathology of the nasal mucous membrane. Changes in the uncomplicated case of any one of a great variety of nasal diseases are sufficiently characteristic to enable us to correlate the clinical and microscopic picture. This is especially true of allergic rhinitis in which we find a very marked and consistent subepithelial infiltration of eosinophiles, dilatation of the glandular structures, intercellular edema and, at times dilatation of the vascular channels. However, in the presence of secondary infection of the mucous membrane following upon a sinusitis, these characteristic microscopic changes no longer are found and a superimposed purulent rhinitis hides the picture. We find instead an increase in the lymphoid element, hyperplasia of the connective tissue, a disappearance of the eosinophiles and a thickening and metaplasia of the epithelium which becomes squamous in character. The result is that often the microscopic picture cannot be distinguished from that of an infectious rhinitis in which allergy played no part[3]. Therefore, even a detailed microscopic examination of the tissues involved may not enable us to say that a preliminary allergic state has preceded the infection.

And yet as difficult as the problem might seem, we utterly fail in carrying out our duty as rhinologists if we do not make every effort to correctly determine the etiology of any given case of turgescent rhinorrhea, for without such a correct interpretation any therapeutic measures which we may carry out are bound to be unsatisfactory and result in many needless surgical procedures.

How can we avoid such errors? It seems to me that in any case of turgescent rhinorrhea we are less apt to err if we follow a definite routine of examination based upon those few factors which we know tend to point out the presence of an underlying protein sensitization. There are only five ways by which we can distinguish an allergic from a nonallergic turgescent rhinorrhea. These are history, local examination, microscopic study of nasal secretion, histologic tissue examination and allergic studies. The first of these is a careful clinical history supplementing our ordinary routine of history, taking

in that detailed inquiry must be made concerning the possibility of the existence of an allergic state. It may be extremely helpful to know that a patient suffered in early life from eczema or urticaria, or that there exists in the patient's family some member or members with asthma or typical hay fever. We are often helped by the knowledge that at the onset of nasal complaint, perhaps many years before, there existed a definite seasonal element, or an exacerbation of symptoms in a particular environment. It is unnecessary to further point out the details of taking a history that would enable us to suspect an allergic state, but such a history is of prime importance and of no value unless extremely thorough and complete.

The next step in arriving at a successful diagnosis is the gross examination of the nasal cavity. I believe we can learn nothing concerning the etiology from the examination of the nasal mucous membrane if a turgescent rhinorrhea is present, for the gross picture of the membrane, not the nose as an entity, but just the membrane, is exactly the same whether the rhinorrhea be due to physiological causes, anatomical abnormalities, foci of infection or an allergic state. This is a radical departure from our pre-existing ideas but these various factors so frequently complicate one another that the effort to arrive at a conclusion is more apt to mislead than it is to help. If by an examination of the nasal mucous membrane we are able to say that turgescent rhinorrhea is or is not present, we have accomplished a great deal, even though no light has been thrown upon etiology. It is obvious that if no anatomical defects or infections are found these can at once be ruled out as a causative agent, but their presence does nothing more than suggest the possibility that they may be the cause of the rhinorrhea. It will be rare, indeed, to find no complicating factor such as a sinus infection, polyp formation or a hypertrophic turbinate, regardless of what the cause might be.

It is assumed that if there is evidence of sinus disease such diagnostic measures as antral puncture or X-ray will be carried out.

The third step in our diagnostic procedure should be a microscopic examination of the nasal discharges in order to determine the presence or absence of eosinophilic cells. The presence of a few eosinophiles is suggestive of allergy, and the occurrence of large numbers of them almost pathognomic. The absence of the eosinophiles, especially in chronic cases with suppuration, means nothing. This is a simple procedure, often times of great help and in no case should it be neglected. We must understand, however, that a few eosinophiles can be found in any turgescent rhinorrhea, whether allergic or non-allergic[5].

As the next and fourth step, I see no reason why the rhinologist should not follow the fruitful expedient of the general surgeon and attempt to establish the diagnosis by performing a biopsy. Our knowledge of the pathological changes is now sufficiently definite so that in attempting to differentiate allergic from nonallergic rhinitis, we are justified in removing a small section of a turbinate or mucous membrane for microscopic study. The pathological changes are sufficently exact so that in an uncomplicated case a positive diagnosis can be made, which would otherwise be impossible. Unfortunately, in the presence of suppuration even this measure may fail and force us to admit that microscopic study has been in vain, although Hansel[5] believes an allergic background can be recognized even in the presence of secondary infection. It will be of inestimable value in those cases where, for example, a deviated septum may exist with a turgescent rhinorrhea, and where there is doubt whether the irritation of this anatomical deformity plays an etiologic role. I would suggest that if a turgescent rhinorrhea exists in the presence of some complicating factor that the tissue for biopsy be taken from that side showing the fewer gross pathological changes for the allergic phenomena are widespread throughout the nose, whereas the secondary changes that complicate the picture are more apt to be localized to that side showing the most marked disease changes.[5]

As a result of the examination so far, we find ourselves in one of two positions. First, for example, from such observations as typical history, or definitely allergic microscopic changes in the tissue removed for biopsy, we realize that the case at hand is a turgescent rhinorrhea due to allergy. In this case there is no alternative but to refer our patient to an allergist for a differential diagnosis to determine the offending protein or proteins and for proper immunization. The indications in this instance are clear-cut.

More often, however, our findings will not be sufficiently definite to warrant an exact etiologic diagnosis. Our position will be one in which an allergic basis for the turgescent rhinorrhea is suggested, but, in addition, other factors are present which lead us to believe that they in themselves may have been primary from an etiologic standpoint. It is in this particular type of case, where it is difficult to decide whether our duty lies in referring the patient to the allergist for further study or whether an attempt should be made to treat the local nasal condition, whatever it might be. There can be no question but that if the patient is able to afford the time and money necessary for allergic studies it is distinctly advantageous to carry these out and to proceed with therapy as indicated by our findings as a whole.

It is my personal opinion that every case of turgescent rhinorrhea should be studied from an allergic basis before treatment is instituted. There are, however, certain instances in which an exception may be made and in which it is justifiable to carry out local treatment prior to the allergic studies in an attempt to cure rhinorrhea. These indications are definite. If we find, in a patient with turgescent rhinorrhea, such intranasal pathology as will require local treatment, whether it is or is not the etiologic basis for this condition, I feel that such local treatment may be carried out before allergic studies are made, because this treatment by the very nature of the pathology will eventually be necessary, and there is a possibility in each case that the rhinorrhea may have been due to the local condition which we feel called upon to treat. It is important, however, to be sure that our operation will have been necessary, regardless of any allergic state which we may later on find to be present.

The ability to decide this question will account in a large part for the success or failure of our surgical procedures. Many cases of suppuration or hyperplastic changes about the nose will cure themselves after proper immunization to an offending foreign protein but it is obvious that if, for example, a large polyp is present or there exists a chronic extensive sinus infection these will eventually require surgical treatment, and it is not illogical to treat these at once if doubt exists concerning the part they may play in the etiology of the turgescent rhinorrhea. These are merely instances of such pathology, and the detection of other similar conditions which justify treatment without allergic studies requires that nicety of judgment which can comes only from long experience and careful observation.

It is my impression that one whose experience is limited in the treatment of this disease will find his results far more satisfactory if he refers each case to the allergist for study prior to the institution of surgical measures and postpones local treatment until he is certain that there is no allergic background. If the patient is found sensitive to foreign proteins, local therapy should be postponed until such time as a thorough course of immunization has reduced the intranasal pathology to a point where the residual disease can no longer logically be expected to improve except as a result of surgical measures.

Because of frequency of complications of allergic rhinitis by local nasal pathology, the diagnosis and treatment of which falls directly in the field of the otolaryngologist, it is almost obligatory on the part of the allergist to subject each case of allergic rhinitis to a thorough and complete otolaryngological examination, preferably at the hands of one specially trained to carry out this work.

SUMMARY.

The term "turgescent rhinorrhea" is suggested as a substitute for the term "vasomotor rhinitis" since our lack of knowledge of the physiology does not warrant the use of the latter.

The etiology of the above can be allergic or nonallergic and in each case it is necessary to determine which of these is the causative factor.

Certain local nasal conditions, such as deviated nasal septa, polyps and sinus infections, are often present in turgescent rhinorrhea and may represent either the primary etiology or be a complication of an allergic state.

The etiology cannot be determined by a therapeutic trial.

Allergic rhinitis gives characteristic histopathologic changes, which may be markedly altered by secondary suppuration.

The criteria by which we can distinguish allergic from nonallergic turgescent rhinorrhea are the history, examination of the nose, study of nasal secretions, histologic studies of the nasal mucous membrane and the determination of sensitivity to foreign proteins.

It is recommended that a biopsy be taken in all cases of doubtful etiology.

Allergic studies should be carried out before attempting to treat any case, even though it may appear that local causes are the etiologic factor. An exception may be made in those cases where surgery will eventually be necessary, whether the patient is or is not allergic.

Each case of allergic rhinitis should be studied by an otolaryngologist to determine the presence of and to treat complications.

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OSTEOMA OF THE FRONTAL SINUS.*

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Osteomata of the frontal sinus are rather rare. Sewall, in 1918, had collected reports on but 93 cases. Up to 1926, something like an additional 24 cases had been reported, making 117 (Harris).

These tumors are most often encapsulated affairs with a pedicle. A fewer number seem not to be so formed, but are rather to be considered as exostoses with attachment to the frontal bone throughout their entire area, usually to the inner plate of the sinus. The case to be reported is of that type with a firm attachment to the inner plate of the sinus but with projecting nipple-like tips, which were raised above the plate and seem to be the points of growth. These tumors have usually an eburnated outer coating and a more or less cancellous center. The Haversian canals and lacunae are usually irregular in form and arrangement. They are usually covered with the normal "mucoperiosteum' 'that lines the frontal sinus. Numerous cases are on record where the pedicle has become detached, causing what has been called a dead osteoma. Quite occasionally there is a mucocele in connection with the tumor and, again, often the tumor is complicated by an acute frontal sinusitis. Schiller, of Vienna, states that it is a most frequent complication of osteomata of this region.

As to the question of exostoses and osteomata, there seems to be considerable disagreement. Gerber believes the growth is an exostosis unless there is ocular displacement. Ewing suggests that "the course of the growth and the clinical features decide between osteoma and exostosis; that an osteoma progresses until extirpated." Neither of these are completely tenable. Certainly, it does not seem necessary that a tumor shall grow in a certain direction (invading the orbit) in order to be a frontal osteoma. Again, all authorities agree that the treatment of these cases is early extirpation, so that point does not help much in diagnosis. Extirpation of an exostosis should not turn it into an osteoma.

Many of the tumors have their origin in the ethmoid. The theory of their etiology has been that the growth were derived from cartilaginous rests in the ethmoid or, rather, at the juncture of the eth-

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moid and frontal bones, for the ethmoid is developed in cartilage and the frontal bone in membrane. However, the origin of many of these tumors is found definitely at a distance from the ethmoid, taking their origin from the periosteum or even from the cancellous portion of the bone itself. Again, no cartilaginous debris has ever been found in these tumors, as would probably be the case if developed from rests.

Bony tissue, wherever found, often proliferates with trauma, and quite naturally we often get a history of trauma with these tumors. As often, again, we do not.

The tumors are essentially benign. They are slow-growing, though at times they may increase their rate of growth by developing in a matter of weeks more than the amount of the several previous years.

The serious aspect of the tumors is that produced by growth and the results of pressure and encroachment into the cranial cavity and the orbit, and the dangers attendant upon its frequent complication of acute frontal sinusitis.

There may be no symptoms in the early stages. Later the pressure causes headaches and pain in the region of the sinus. Often nothing is known of the presence of a growth until an acute frontal sinusitis suggests an X-ray, which makes the diagnosis. Symptoms of the later stages depend upon the cavity invaded. If into the nasal cavity, the result may be external deformity and nasal obstruction, even to total obstruction. If into the orbit, diplopia, proptosis and loss of vision due to pressure on the nerve are the common signs and symptoms. The old classical description of the findings in a case of frontal osteoma was "proptosis of the eyeball, with outward and downward displacement."

The frequency of this finding is probably what led Gerber to make it a point of distinction between a true osteoma and an exostosis.

Invasion into the cranial cavity often produces severe headaches and may even result in epilepsy. There is often great encroachment upon the anterior fossa as the tumor may become very large. Often there are few, if any, symptoms until the terminal stages, when meningitis develops.

The diagnosis is, of course, by X-ray. External deformity, swelling over the tumor, may be present when the tumor has eroded the external plate of the sinus. An acute sinusitis most often leads to the X-rays that establish the diagnosis.

Prognosis: With the old methods of surgery, removal usually meant meningitis and death. At present, with the modern surgical

methods, most cases recover. Altogether too often the growth recurs however, as with its ethmoid connection complete removal is very difficult. Possibly the trauma of the operation stimulates growth for many cases are reported with recurrences, greater in size than the original tumor, developing in a comparatively short time.

The treatment is surgical. The procedure is that of Killian, with drainage established through the nose when possible.

Fig. 1. Print from X-ray taken Feb. 5, 1923, retouched. The prints without retouching did not bring out the detail that was clearly visible in the film. The extent of the osteoma is easily seen. The large cell on the patient's left was the one involved in the acute process.

Case Report: The patient was a white male, age 23 years. He was first seen in consultation with Dr. E. H. Whitcomb, of St. Paul, on Feb. 5, 1923. Up to that time he stated that he was perfectly well and was working daily as a mechanic in a garage. His only complaint had been an occasional headache, which he ascribed to the gas

from autos. He gave a history of getting oil and dirt in his left eye while draining a car on Jan. 31. He wiped out the dirt with a rag that was handy and paid no further attention to it. However, that night he noticed that the eye was somewhat tender and sore. The next morning it was red and swollen, painful, and he had a severe headache. The following day it was practically swollen shut. He

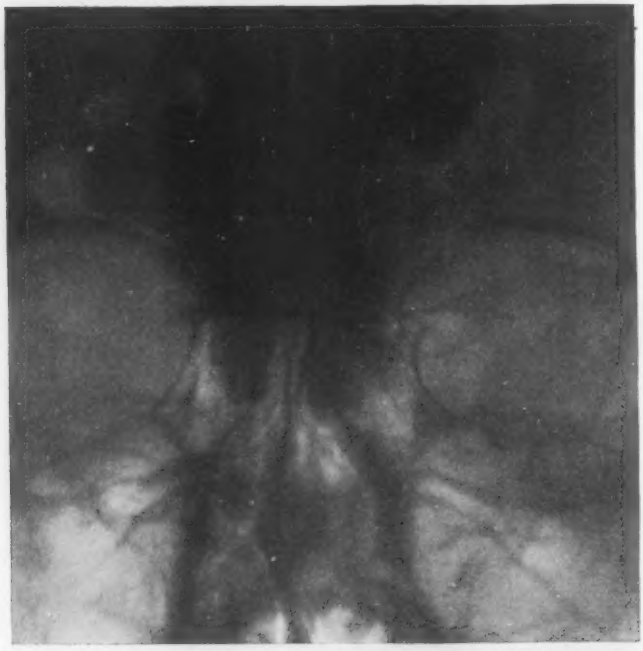

Fig. 2. Print from film taken Jan. 30, 1930, retouched. The increase in the size of the growth is quite evident, though for a space of seven years it is not so enormous.

consulted Dr. Whitcomb on Feb. 4, who sent him to St. Joseph's Hospital, where I saw him the following day. He presented a typical picture of an acute frontal sinusitis. He had a temperature of 101.5°, suffered acute pain over the sinus and was very tender to pressure over the sinus. In addition, there was some edema of the bulbar conjunctiva and swelling of the upper left lid. The nose was

negative, there being little or no congestion and no discharge. The usual shrinking treatment for these acute conditions was inaugurated and an X-ray ordered.

Feb. 6, there was more marked edema of the upper lid and conjunctiva and a decided proptosis, though the eye was fairly movable. The cornea was clear. There was a slight blurring of the left disc

Fig. 3. Lateral view showing the depth of the growth, not retouched. All pictures show the extension into the ethmoids.

margins, with some tortuosity of the vessels. The upper right lid was slightly swollen. There was no discharge into the nose.

The X-ray showed a dense lobulated mass extending up into the frontals on both sides, fairly symmetrical, but more extensive on the left side. Cell outlines on the left side were considerably blurred, suggesting an inflammatory process.

Feb. 7, there was little change except for greater swelling of the lids and an increased proptosis, with fixation of the eye. The temperature was 102°.

An external operation was decided upon and the same day the frontal was opened. The regular Killian incision was made through the left eyebrow. On piercing the periosteum pus was liberated. The periosteum was retracted and the outer table of the frontal removed. Presenting immediately in front of us was the bony mass that you see in the X-rays, while temporally was a large cell filled with pus and having a connecting perforation into the orbit, producing there a subperiosteal abscess. This is what was causing the proptosis, which was immediately relieved on freeing the pus. The bony mass, lobulated and filling practically the entire sinus anteriorly and nasally, was attached throughout its entire area to the inner wall of the sinus. The tips projected a bit, suggesting that they were the actively-growing areas. The attachment to the inner plate was very firm and, in the presence of the acute infection, no great effort was made to dislodge the mass. A real effort was made, however, to enter the nose through the frontal duct. But there wasn't any frontal duct; and, what is more, persistent chiseling did not succeed in making an opening. The mass was like ivory and so, for fear of spreading the infection by further manipulations, the effort was abandoned and the wound closed after inserting a cigarette drain through the sinus and into the orbit. The patient made an uneventful recovery, the wound closing completely, with little or no disfiguration.

A year later, he had a recurrence of discharge, which broke through the old scar, yielding pus for several days, and then closed again. It has remained so to the present time.

Comment: As you see, the operation was for the relief of the acute frontal and not for the osteoma. The osteoma was diagnosed from the X-rays and the diagnosis established by the operative findings. Whether you call this growth an osteoma or an exostosis seems to me immaterial. This recent X-ray (taken on Jan. 23, 1930) shows the rate of growth of the tumor. As you can see in the more distinct areas, it is about one-fourth of an inch in the past seven years. According to the literature this osteoma should be removed while it is still comparatively small.

However, here is a young man, with no symptoms, no headaches, feeling perfectly well and working every day. He is unwilling to undergo an operation, especially when we cannot assure him that it is without danger. The attachment is extensive, and extensive exposure of the dura may well be expected. Also there is considerable

extension into the ethmoid and a complete exenteration would be very difficult. Many of the cases reported in the literature show recurrences and these often growing at a faster rate than the original growth. Comparing these two pictures made seven years apart, there is an increase in the size of the mass but it certainly is not very great for a period of seven years. So, all things considered, I think if I had this mass in my frontal sinus I also would decline operation and wait for more serious symptoms before I had it removed.

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THE CAUSE AND TREATMENT OF SOME FRONTAL HEADACHES, WITH REPORT OF CASES.

Dr. Louis Weiss, Newark.

The general practitioner recommends to the ophthalmologist some of the patients whom he cannot relieve of recurring frontal headaches. The ophthalmologist, after a careful refraction, finds that in some of these patients the refractive media are negative as far as lenses are concerned. He in turn refers these patients to the rhinologist. Rhinoscopy reveals nasal obstructions, which usually are a deviated or hypertrophied septum, or hypertrophied turbinates or polyps. Rarely other growths, benign or malignant.

As a consequence of these nasal obstructions, there may be present a single or a multiple sinusitis. Chronic or acute frontal headaches may be due to nasal obstructions alone, or in conjunction with sinusitis. Nasal obstructions are usually the primary cause, and sinusitis the accompanying or secondary cause.

The proper procedure is to remove the nasal obstructions first, which will tend to establish normal aeration of the sinuses. The relief of the stagnated air and evaporation of the fluid from the sinuses allows their mucous membrane linings to assume their normal functions. It will be noted that the sinuses are built for aeration, rather than drainage. Each maxillary antrum has its ostium near the top of the cavity, the sphenoid at about the middle, the ethmoid cells open one into the other, the frontal sinus on each side is the only one that is open at its lowermost point in most cases.

Some believe that intranasal surgery should not be done until about the eighteenth year of adolescence, when further development will not alter the parts. On the contrary, intranasal surgery should be performed as early as possible to prevent maldevelopment. I have seen good results of nasal surgery in a boy age 8 years.

Some claim intranasal surgery destroys protective mucous membrane. Proper intranasal surgery removes only obstructive mucous membrane.

It is said that nasal surgery may cause dryness of the throat. However, mouth-breathing is a greater evil.

Nasal surgery does not usually mean the obliteration of the nasal contents. It means rebuilding the nasal passages to effect normal breathing. No one is likely to object to the straightening or the thinning of the septum, or the removal of polyps and other growths.

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The remaining nasal obstructions are the hypertrophied turbinates. They, too, are undesirable in their hypertrophied state, and should likewise be subjected to correction.

An objection may be registered to insufficient nasal surgery, which leaves the patient with the same symptoms as before.

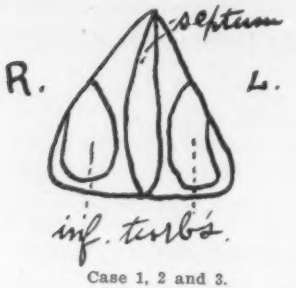
Severe frontal headaches with fever, rapid pulse, prostration, etc., may be caused by acute frontal sinusitis, usually a sequel to nasal obstructions, necessitating confinement in bed. The best position in bed is to have the patient recline at an angle of about 45°, with the head resting almost in a vertical position, to reduce the blood pressure in the affected area to a minimum, lessen the congestion and favor drainage.

For the pain in the head, give one-fourth grain of morphin sulphate once or twice daily until relieved, by mouth usually, or subcutaneously if necessary, or you may choose your own analgesic.

In acute sinusitis, you may use stock vaccines routinely, or preliminary to autogenous vaccines. This will give the patient the benefit of early hypodermic treatment. Frequently I injected 5-10 c.c. of normal saline solution, which is known to have properties similar to those of the antitoxins, which stimulate the body's own antitoxins, the real remedies against disease. Hypodermic injections may be repeated in the course of a disease if tolerated.

The subcutaneous or intramuscular route is the safest and best. These tissues act as strainers. Should any insoluble impurities be present in the injection, they will remain in the cellular or muscular tissues, to be slowly absorbed, or encapsulated, or discharged through an abscess externally. With injections made directly into the circulation, no such protection is possible.

The injection is usually made into the arm, very slowly, about one drop per second, with the patient in the recumbent position. Before the injection, the pulse, and sometimes the blood pressure, is taken or the heart examined. During the injection one finger is kept on the pulse, or the stethoscope is used over the apex of the heart. In this way the patient's tolerance for hypodermic therapy and his resistance to disease is determined. By watching the pulse or heart action one will notice that the effect of a hypodermic injection is immediate. If the pulse or the heart beat is strengthened or remains the same, the injection is continued and considered safe and beneficial. Should the heart or pulse become abnormally quickened or slowed or irregular in any way, the needle should be withdrawn to avoid overstimulation. It is this overstimulation, unheeded because usually unknown, that produces dire results, which are sometimes irreparable. The body receiving an injection may be likened to a



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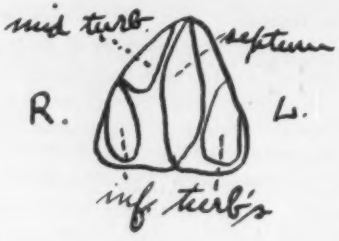

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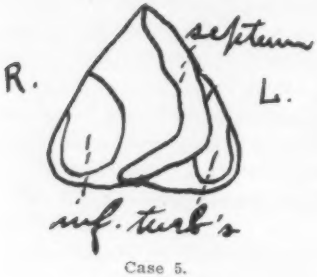

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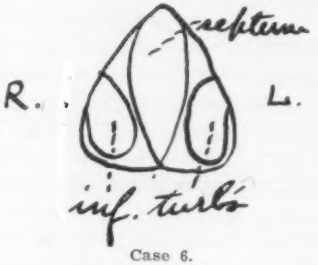

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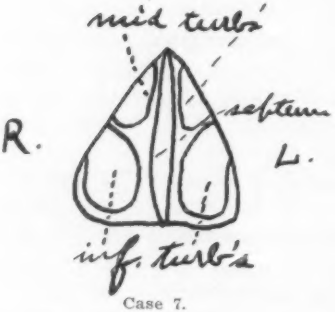

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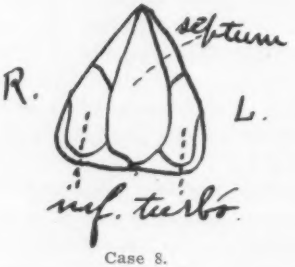

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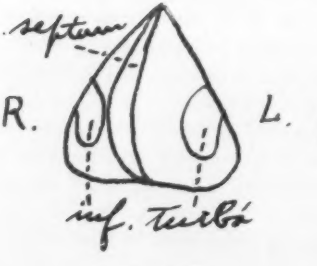

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Case 11.

machine in which there may be caused a sudden acceleration of the motor that sputters at first, then finally stalls.

Hypodermic injections should never be made in haste. The procedure should be taken seriously. A hypodermic injection is an assault upon the body *locally* and *generally*. If injected subcutaneously or intramuscularly and the fluid is forced in among the tissues rapidly, there may be a tearing of some of the structures, which may cause pain and inflammation. If the injection is made slowly, the elastic cellular tissues have time to accommodate the fluid, most of which is absorbed by the time the needle is removed. The general effect is upon the heart, the limit of whose resistance must be watched, through the pulse or stethoscope.

Elimination by cathartics or enema should be recommended, when indicated.

The diet during the fever stage should be only warm water, plain or sweetened or flavored by some fruit juice, or very weak sweet tea. In the acute stage of the disease the system must be depleted, not gorged. Permit no solid food including milk. Milk when swallowed changes from a liquid to a solid, cheesy curd, like Dr. Jekyl becomes Mr. Hyde. Milk may be all right outside of the sick stomach but not in it. As the fever lessens, add to the diet cereals cooked in water and properly seasoned, and as the improvement warrants introduce other foods, first the ground foods, fruits and vegetables, and lastly the animal foods, the dairy products, meats and fish. All foods should be thoroughly cooked. They are then purest and most digestible. No raw food should be allowed during the acute stage of illness. The physician, not the cook, should supervise the diet. The patient's diet should be made to order, and not ready-made, irrespective of his condition. The diet affects the progress of the case and therefore is important.

Acute sinusitis is sometimes ushered in by a chill, which is soon followed by fever. The first stage or beginning of the illness therefore is a cold. Fever constitutes the second stage. Fever or excessive heat is generated in the body to resist the invasion of cold into the body. Cold is therefore the aggressor and the cause of the illness. Fever is the opposition or the defender and the promoter of health. Cold is an enemy and fever a friend in illness. As a rule the height of the fever is in proportion to the severity of the cold. Treatment, to be successful, should follow Nature's course, that of using heat to counteract cold.

To the forehead apply several thicknesses of cloth or sterile gauze, to be held in place by a 2-inch sterile gauze bandage to insure constant warmth of the part. Keeping the forehead warm and dry is

preferable to frequent applications of cold and wet cloths. The former method utilizes the local body heat for healing, and is soothing and restful, and tends to induce sleep, and stimulates sinus discharge. The latter method disturbs the patient incessantly and retards recovery. Application of an ice bag or cold wet cloths drives the blood from the surface inward toward the sinus, and adds to its congestion, and increases the pain, and may cause another chill and pneumonia, a disease which is a frequent complication of other diseases, with cold as the connecting link. A cloth around the neck to protect the important structures is grateful to the patient. Warm pajamas should be worn. Cold feet should be dressed in woolen stockings or socks. Cold hands should be kept under warm covers, generously supplied to keep the body comfortable.

Keep the patient out of draughts. Place the head of the bed furthest from windows and doors. In warm weather open the windows in the patient's room. In cool weather open the windows in the adjoining room connected by an open door, or otherwise maintain fresh air ventilation free from draughts.

Have a thermometer near the head of the patient's bed to regulate the temperature of the room, which should be about 70° F. If possible, place the patient in a room facing the south during the cool seasons. Do not permit the use of an electric fan upon the patient for any purpose. It may be advisable, in some cases, to have a day and night nurse, and not to allow visitors while the acute stage lasts.

Intranasal medication is helpful. Ischemic remedies, such as cocain, adrenalin, ephedrin, epinephrin and the like, may be used with good effect for a limited time. They shrink and blanch the mucous membrane, and thereby improve nasal breathing, lessen the pain, and assist sinus drainage.

Allow sufficient time for convalescence to prevent an early recurrence.

After health is restored, remove the nasal obstructions, and do any sinus surgery that may be necessary to prevent further suffering.

In presenting the following few case reports, with illustration, I have selected those that will give the most intelligent interpretation of what I have been trying to convey in my previous statements.

Case 1: M. C. C., male, age 52 years; occupation, real estate; complained of frequent frontal headaches, for which he blamed his eyes. He was refracted. His vision in each eye was 20/20. He accepted no lenses for distance. For reading +2.50 spheres were prescribed.

Further examination showed nasal obstruction by hypertrophied inferior turbinates. Correction of the nasal passages was recommended for his relief.

Case 2: J. C., female, age about 50 years, complained of pain in the eyes and forehead off and on. The patient sought relief by means of refraction, which showed O.U. 20/20 and no glasses required for distance. Near vision needed +2.50 spheres.

Here again the inferior turbinates were hypertrophied and called for careful attention on the part of the rhinologist.

Case 3: P. C., the third member of the family (these nose conditions often run in families), female, age about 23 years, secretary by occupation, was wearing so-called rest glasses for the past year, because of pain in the eyes at frequent intervals. She was not relieved and asked for better glasses. Refraction showed O.U. 20/20, and no need for any glasses.

Her tonsils were small. There was no history of tonsillitis. Both eardrums were normal. The inferior turbinates were hypertrophied and obstructed normal aeration of the sinuses. This patient's vocation favored congestion in the head, which aggravated the symptoms which she thought would be relieved by glasses. Ten drops of a 2 per cent cocain solution in each nostril gave temporary relief. Removal of the nasal obstructions ought to yield permanent relief.

Case 4: S. O. S., male, age 32 years, canvasser, was wearing O.U. +.25 cylinder axis 180 for his frontal headaches and dizziness. A year ago he had his tonsils removed and had some work done in his nose. Neither the glasses nor the operations helped. Refraction revealed 20/20ths vision, in each eye, and glasses of no benefit.

Both ear drums were normal. Nasal examination showed a hypertrophied middle turbinate on the right side, together with both inferior turbinates hypertrophied, the right less than the left, but both were touching the floor of the nasal passages. The septum was moderately hypertrophied. To produce normal breathing and aeration of the sinuses in this patient all nasal obstructions should receive attention.

Case 5: J. M., age 12 years, complains of frontal and vortex-headaches. He was brought to me for refraction. Examination showed vision in each eye was 20/20, and lenses were not acceptable.

His tonsils had been removed. His eardrums are normal. The septum is deviated to the left and overlaps the left inferior turbinate and completely blocks the left nostril. Both inferior turbinates are hypertrophied and touch the floor of the nose. In this case relief can only be expected after proper correction of the abnormalities present in the nose.

Case 6: I. F., female, married, age about 23 years, came for a prescription for glasses for her chronic frontal headaches of a severe type. O.U. 20/20, does not accept lenses as per refraction.

The septum is hypertrophied in a wedge shape with the large part uppermost. The inferior turbinates are enlarged. Thorough and careful intranasal surgery should produce the desired result. Medical treatment is temporary, and glasses are a disappointment in this and similar cases.

Case 7: F. G., female, age about 20 years; occupation, clerical work; complains of frontal headaches, frequent head colds and dry throat. The object of her visit was an eye examination. Her vision was 20/20 and refraction produced no lens prescription.

The middle and inferior turbinates in each nostril are hypertrophied, and each enlargement should be properly reduced. An ischemic remedy will only give Scotch relief, which is too brief to recommend highly.

Case 8 (June 8, 1927): L. C., female, age 18 years, typist, has been having headaches, mostly frontal, for the past six years. The headaches usually start on rising in the morning, and may last a whole day. She wears glasses prescribed four years ago. Her vision is 20/20. Refraction precludes the need for lenses.

The tonsils were removed 10 years ago. Both eardrums are normal. The hypertrophied septum and the hypertrophied inferior turbinates are in close contact with each other. They seem to have a pressing engagement, while the frontal sinuses are painfully waiting for relief.

Case 9: Miss R. S. S. has been wearing glasses for several years without any improvement in her frontal headaches. Vision in each eye is 20/30 but accepts no lenses.

The only abnormality was a septum deviated quarter-moon-like to the right, touching the right inferior turbinate. A submucous resection was recommended.

Case 10: Miss E. C. K., age 25 years, stays at home. She has chronic frontal headaches, although she has worn satisfactory glasses since 9 years of age. O.D. with —1.25 sphere —1.25 cylinder axis 180, vision is 20/30. O.S. with —4.25 sphere, vision is also 20/30. Without glasses, right eye vision is 20/200 and left eye vision is fingers at 10 feet. Present refraction required no change in lenses.

The tonsils and inferior turbinates were hypertrophied. Removal of the tonsils and establishment of normal nasal breathing was advised.

Case 11 (May 15, 1923): G. T., age 42 years, married, works in a celluloid factory; suffered from frequent colds in the head, frontal headaches, burning of the eyes, and a discharge from the nose and throat. Examination showed hypertrophied tonsils and a hypertrophied septum deviated to the left. May 17, two days later, the tonsils

were removed, but improvement came only after the submucous resection on Jan. 11, 1924, nearly eight months later.

Case 12: M. S. S., age 34 years, married, a wholesale grocer, was wearing glasses to improve his sight and lessen his frontal headaches. Vision was advanced from 20/70 to 20/30 in each eye, and refraction showed his present lenses were quite all right, but his headaches continued.

The nose was blocked by a hypertrophied septum and by hypertrophied inferior turbinates. They were operated upon in three stages. The nostrils were freed of their encumbrances, and the patient has no complaint to make on that score.

Case 13: In October, 1921, Miss C. A., stenographer, age 19 years, called to have her eyes examined for glasses, because she had suffered from frontal headaches ever since her school days. She was wearing before each eye +.25 sphere +.25 cylinder axis 90 with no relief. Her vision with each eye was 20/20, and refraction negative. She stopped wearing glasses and a change in occupation was also advised. In November, 1926, about five years later, she returned with the same complaint, although she stayed at home and only did a little bookkeeping for her father. Refraction again showed normal vision and no need for lenses.

But this time my examination was more thorough. The throat showed little tonsil tissue, and both eardrums were normal. The nostrils were obstructed by hypertrophied inferior turbinates, attention to which relieved her from her headaches.

Conclusions: This type of frontal headaches is mostly chronic. The patient is not necessarily confined to the home. He keeps at his task and is long on suffering. Finally, the patient makes his or her own diagnosis and goes to the optometrist for a refraction and receives glasses. He or she wears them for a variable length of time, according to the individual temperament. It may be days, months or years. His patience with the glasses exhausted, he appeals to his physician for relief. His medical mentor tries his best, but fails to cure the headaches. Then if the patient has not already consulted an ophthalmologist, the family physician recommends one, if he gets the opportunity. The ophthalmologist may prescribe for some latent ametropia, or give advice, or refer the patient to a rhinologist. The rhinologist may not see anything in the nose, for it is usually blocked. If he does advise intranasal surgery, the patient seldom follows the advice, and so we're back where we started.

849 South Eleventh Street.

ORIENTATION OF SOUND—A PROBABLE FUNCTION OF THE VESTIBULAR LABYRINTH.

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Physiologically and anatomically the internal ear is divided into two parts: *1.* the anterior inferior part, the cochlear labyrinth, or organ of hearing; and *2.* the posterior superior part, consisting of the saccule, utricle and semicircular canals (the vestibular labyrinth, or organ of equilibration). By the organ of equilibration is meant: *1.* the function of static equilibrium, or orientation of the position of the head in space; and *2.* the function of dynamic equilibrium; that is to say, the ability to perceive accelerated motion of the body in space and to perceive change in direction of motion. I say accelerated motion of the body because we do not have the capacity to detect uniform motion, that is, motion at a constant velocity. We can perceive only change in rate of motion and change in direction of motion. But just as there is a threshold of sensation for other sensory organs, so also is there one for the organ of equilibrium. Weber's law also applies here.

In speculating as to the reason why Nature has so constructed two mechanisms, the organ of hearing with the organ of equilibration, which have so vastly different functions we are caused to wonder what is the association of these two functions. It is reasonable to assume that there is a definite purpose in so constructing these two organs; that this anatomical relationship is not an accidental one.

Jones[1] states: "A possible connecting link between the sense of hearing and of equilibrium, as seen in the human internal ear, is suggested by Bonnier in the following functions: *1.* Baresthesia. By this is meant the appreciation by the utricle and saccule of the pressure exerted by the external media, whether liquid or air. *2.* Seisesthesia. By this is meant the appreciation by the utricle and the saccule of abrupt variations of the pressure from external media. These two functions are neither hearing on the one hand, nor the sense of motion or station on the other. The ability of the saccule and utricle to recognize pressure from the external media might well be regarded as an intermediary function between the sense of balance and the sense of hearing." If this is so, as it may be, it seems too far-fetched to be a connecting link. As a probable association between the functions of sound perception and spatial orientation, I

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suggest the function of sound orientation and will attempt to offer reasons for attributing this latter function to the vestibular mechanism of the inner ear.

That animals have a sense of sound orientation, the capacity to detect the direction from where sound approaches, is a matter of common experience. We have all no doubt observed this ability in ourselves. The lower animals in whom this sense is apparently more highly developed than in man, in order to protect themselves from an enemy, must not only be aware of the presence of its foe, but also of its position. The senses of sight and smell are attributory, but they are not adequate for all occasions. Hearing is another aid but does not *per se* locate the relative position. This is accomplished by the mechanism of sound orientation. This capacity for sound orientation seems, from speculation and from clinical observation, to be vested in the internal ear as the peripheral receptive end-organ of this function.

Speculative Reasons: That the function of the cochlea is concerned with audition, and that of the vestibular labyrinth with spatial (static and dynamic) orientation is established fact, even though their mechanisms and central pathways are still far from settled. So far as is known, no organ other than the cochlea is concerned with sound perception, whereas sight and muscle sense are contributory to spatial orientation along with the vestibular apparatus. Among these the vestibular labyrinth plays by far the greatest role. Next comes visual sense, and finally muscle or joint sense.

Since the vestibular labyrinth is the chief organ of spatial equilibrium of the body, and inasmuch as it is in such a unique anatomic relationship where the bony capsules of each are continuous and identical in structure; and wherein the endo- and perilymphs are in direct communication in both labyrinthine divisions, and composed of the same fluid from the same source, *i. e.*, the fluid of the subarachnoid space; and, inasmuch as it is an easy physical possibility for disturbance in motion or pressure imparted to the cochlear apparatus by sound impulses to be transmitted to the lymph fluid in the vestibule, and, indeed, it is difficult to conceive that there should be no consequent disturbance either of pressure or of motion of the endolymph fluid in the vestibular labyrinth, it seems reasonable to assume that the labyrinth of orientation of space also serves to orient the spatial direction of sound impulses imparted to the cochlea.

And, further, is it not most efficient to place the receptive organ for sound orientation in as close a proximity to the organ of sound reception—the cochlea—as possible, rather than at a more remote location? When Nature associated the organ of hearing with the

organ of equilibration, both of so widely different functions, she had as definite a purpose in so doing as in crossing almost all of the fibre pathways from one cerebral hemisphere to its contralateral somatic distribution. To go into the philosophy of this latter point, interesting as it is, is aside from the purpose of this paper.

Again, in order that the brain might orient sound direction, the afferent impulses of the sound and those conveying the impulses of orientation must reach the terminal cerebral endings where these impulses are appreciated mentally. This synchronization of the time element of the sense of audition and the sense of directional audition is best accomplished when the peripheral perceptive end-organ of hearing, the cochlea, and the peripheral perceptive end-organ of sound orientation are stimulated as simultaneously as possible. This simultaneous stimulation is possible to a remarkable degree by virtue of the anatomic and physiologic arrangement of the ear labyrinth where the organ of hearing is so intimately tied up with the organ of orientation.

In examining the anatomy of the membranous labyrinth we note that the utricle is intimately related with the semicircular canals, the ampullae of the canals opening directly into the utricle, whereas the saccule is very proximal to the cochlea, being in direct communication with the latter by means of a short duct, the ductus reuniens. Therefore, because of this anatomical relationship, impulses from the cochlea can readily be imparted to the macula of the saccule and with great difficulty to the end-organs of either the utricle or semicircular canals. This suggests the probable role of the saccule in sound orientation.

The process by which sound orientation is accomplished is about as follows: The sound waves strike the membrana tympani, are conveyed by the ossicles of the middle ear to the footplate of the stapes, which impart the impulses to the vestibule (cisterna perilymphatica vestibuli). From here the impulses pass directly into the scala vestibuli of the cochlea, thence to the endolymph through Reissner's membrane. From the endolymph of the cochlea (ductus cochlearis) the impulses pass through the ductus reuniens to the saccule in the vestibular labyrinth, which most likely is the end-organ of sound orientation.

The macula acustica utriculi and the cristae ampullares are not affected by these impulses because of the too great distance and circuitous route which the impulses must take in order to pass from the cochlea to these end-organs. However, if the sound is of sufficient intensity and abruptness of onset, such as, for example, that produced by an explosion, the impulses may then be conveyed to

these organs and a momentary giddiness result, as has been experienced by many.

Clinical Observations: Boy, age 14 years, admitted to the otologic clinic of Professor Neumann in Vienna, with an acute bilateral otitis media of three weeks' duration. Examination showed a bilateral mastoid involvement clinically and Roentgenologically. There was a spontaneous horizontal rotary nystagmus with the quick component to the left, of large amplitude and rapidity. No vertigo or nausea was complained of. Warm caloric (53° C.) irrigation of the right ear did not retard the nystagmus, which inference is drawn that the right equilibratory labyrinth was inactive. Hearing was lost for all forks except C^5, which was heard for only about two seconds. The patient could also hear loud shouting, but could not repeat the word shouted.

Testing the left ear, in which the hearing was fairly good, the patient could, with a marked degree of accuracy, orient the direction of the sound. The orientation of the sound was tested by the open method and also by employing a 3-meter tube, one end of which was held in the patient's ear to be tested, and applying the sound at the other end. The above method was tried with both ears. In testing the right ear the patient could not orient the sound direction. This, in view of the inactive labyrinth (no response to the warm caloric test) and some perception of sound being present, is strong evidence in favor of the vestibular labyrinth's being a peripheral end-organ for the directional localization of sound impulses.

Summary: As an explanation for the anatomical and physiological relationship between the organs of audition and equilibration, I suggest another function of the vestibular labyrinth, namely, that of sound orientation, the end-organ of which is probably the macula acustica sacculi.

Of the vestibular apparatus, it may be said to be an organ of orientation of which there are three kinds, *viz.:*

1. Orientation of the position of the body in space.

2. Orientation of accelerated motion of the body and of change in direction of motion.

3. Orientation of sound impulses.

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41-60 Bowne Street.

VARICOSE ANEURISM OF THE AURICLE.*

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Varicose aneurism is one of the two types of arteriovenous aneurism. The other type is aneurismal varix and the distinguishing feature between these is that the latter indicates a direct connection between the artery and the vein, while in the former there is the intervention of a sac. The case under consideration is that of a varicose aneurism.

The distinguishing features, according to Osler, are as follows: *1.* There is swelling of the part caused by the distention of the veins. *2.* On palpation a vibratory thrill is felt of maximum intensity over the position of the orifice, but widely diffused. When a sac intervenes between the artery and vein it may be felt and presents aneurismal pulsation, forcible and expansible. *3.* On auscultation there is heard everywhere over the enurism and above and below it a *bruit de diable* of great intensity. Broca mentions the interesting circumstance of much greater growth and development of the part, which he attributes to the venous engorgement.

This patient, V. Y., age 15 years, presented himself at the Manhattan Eye and Ear Hospital on the service of Dr. John B. Rae, complaining of swelling of the right ear since birth, occasional spontaneous bleeding from the lobe during the past two years and subjective tinnitus. His family history is negative. The hearing was normal, Wassermann negative and the blood pressure normal. He was born at home. A midwife took care of his mother. The father noticed that the right ear was larger than the left at the time of birth. This enlargement, however, cannot be attributed to any injury, including instrumentation. The ear is uniformly enlarged throughout. The entire cartilage is hypertrophied. The skin is a dark bronze color.

There is a definite pulsation which is synchronous with the systolic heart beat, most marked over the lower half of the auricle and the lobe. A continuous thrill is felt in this area with its greatest intensity at the tip of a small tumor which is located in the dependent portion of the lobe. The plexus of veins visible over the mastoid process runs anterior to the postauricular fold into the auricle. The tragus is not involved. A distinct bruit is heard over the lower half

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of the auricle, anterior to the tragus and over the mastoid process. The line of propogation extends downward to the angle of the jaw and thence along the course of the external jugular vein. This bruit can be obliterated by pressure over the carotid artery at the

level of the thyroid cartilage. X-ray pictures of the mastoid show a much greater development on the right side, otherwise the cellular structure is normal.

He has had no previous treatment other than pressure applied locally during the times when bleeding occurred. He was admitted

to a hospital in this city but was denied surgical treatment because of a bad prognosis. The arterial supply of this aneurism was thought to be either the posterior auricular, a possible branch of the occipital or anomalous branch of the external carotid.

Operation: Insofar as the logical treatment seemed to be ligation of the afferent artery and obliteration of the sac if possible, we decided to tie the posterior auricular artery. An incision was made over the mastoid process similar to that for a simple mastoid operation. This was carried downward and forward below the angle of the jaw anterior to the sternomastoid muscle to the level of the thyroid cartilage. The bleeding in the upper portion of the incision was profuse and venous in character. The posterior auricular artery could not be found nor was any vessel posteriorly leading to the auricle.

A ligation of the external carotid was then decided upon. The carotid sheath was opened, exposing the contents down to the thyroid axis. A condition worthy of note was that of the internal jugular vein. It was about the size of the index finger. The occipital artery was tied and divided, a double ligature of 20-day chromic catgut was placed around the external carotid just above the facial artery. On tieing these the pulsation and thrill in the auricle ceased immediately. The color of the ear, however, remained the same. All venous bleeding was either tied or transfixed. The wound was closed with clips and a small rubber tissue drain inserted in the most dependent portion.

On recovering from anesthesia the subjective tinnitus had disappeared. He made an uneventful recovery.

80 East 77th Street.

ELONGATED STYLOID PROCESSES; THEIR FORMATION AND CLINICAL SIGNIFICANCE.

Dr. Max M. Kulvin, Chicago.

Although the writer realizes that this paper does not discuss a subject of paramount importance, still the condition is not one of very common occurrence, and there are several points of common interest, both from standpoint of symptomatology and clinical significance.

DeMarchetis, in 1652, was the first to refer to ossification of the stylohyoid ligament. Weinlecher, of Vienna, in 1872, reported the first removal of the elongated process. There has been very little mention made since then, possibly due to the seeming unimportance of the condition rather than to a lack of cases.

The process arises, according to von Eicken, from the upper part of the second visceral arch, or Reichert's cartilage, extends from the under-surface of the petrous portion of the temporal bone forward, downward and inward. The tip is cartilaginous. The stylohyoid and stylomandibular ligaments and stylohyoid and styloglossus muscles are attached to the tip. The stylopharyngeus muscle is attached to its base. Normally, it measures 2½ c.m. The process moves with rotation and nodding of the head.

The elongation may result from ossification of the styloid ligament and reach as far as the lesser cornu of the hyoid bone, or it may be directed inward and forward and encroach upon the tonsil. In such cases they are 5 to 6 c.m. in length. Oliver, in four cases, found complete ossification of the process with absence of the musculus stylohyoideus profundus. In the dog, ossification of the ligament is constant.

There is bilateral involvement, though not symmetrical formation, in 50 per cent of the cases.

The majority of cases occur in men.

The symptoms vary with the location and length of the elongation. Many cases display no symptoms whatever and the presence of these processes is disclosed only during and after an operation. The various complaints are of interest. Some have a "dragging" sensation in the throat, worse on swallowing, with a shooting pain into the ear. This is of interest as demonstrating the approach of the nerve to the

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middle ear and tube. Others have pressure sensations in the throat and fullness in the ear. Lumps and scratchy sensations are a common complaint, feeling as if a fish bone were stuck in throat. Another patient had pains in the throat and along the mastoid bone; others had them along the nasal bones and down the shoulder.

Von Eicken noted that the N. glossopharyngeus lies in close approximation with the styloid process after emerging from the foramen jugulare and, in some cases, approaches the tonsillar region on one side, and the middle ear and tube on the other side. This may explain the pains that radiate toward the ear on swallowing, as in one of the patients mentioned.

He further noted that the elongated process is composed of more than one piece, held together by a band. This then may explain how it is possible that one, free of any pain from childhood on, may begin to have trouble. It is in these cases, he thinks, that ossified extensions of the lig. stylohyoideus become fixed with the posterior part by connective tissue.

The diagnosis of elongated processes may be made prior to, during and after operation. During the operation, if any great unlooked for difficulty arises, especially on attempting to snare the tonsil, the most likely cause is an elongated process. The majority of cases are discovered after operation. This proved to be so in my own experience. A diagnosis prior to operation rests on: *1*. Pain on swallowing. *2*. Absence of any definite visible pathology in tonsil and throat region. *3*. Bearing this possibility in mind. *4*. Bimanual palpation, in which the object felt moves with nodding and rotation of the head. *5*. X-ray examination, which may demonstrate the extension of the process.

The treatment of those cases which are causing trouble is purely surgical. When the elongated processes cause no trouble, as in those types discovered during and after operation, it is advisable to leave them alone. Often it is found that the protrusion retracts into the bed of the fossa, as in my patient. In the surgical cases the muscles around the projection are separated and with a bone forceps the process is removed as far back as it can be outlined. It is essential that no damage be done to the facial nerve, which with the stylomastoid artery passes through the stylomastoid foramen, posteriorly to the base of the process.

The significance clinically of the elongated processes lies in several factors, as summed up by Shee and Dwight:

1. In search of foreign bodies in this region confusion may result, as to whether the processes are the cause of the sensation of the foreign body, or whether a foreign body also be present.

2. It may be encountered in passing a needle for a bleeding vessel.

3. During tonsillectomy, the tip may be caught in the snare, making the operation cumbersome.

4. It may be met in incising a peritonsillar abscess.

5. In the event it becomes necessary to ligate the carotids, the long process may be found lying snugly and firmly between them, impeding proper work.

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AGRANULOCYTIC ANGINA.*

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The laryngologist may be called on to make a diagnosis and to suggest treatment in a case of agranulocytic angina. Because of the tendency of the ulcerous patches, characteristic of this disease, to appear in the mouth, the nose and throat consultant is expected to be familiar with its clinical picture. The condition, however, is so new that standard text books give it only passing mention, and papers on the subject appear but rarely in the literature. With a view to summarizing our knowledge of this disease, and of organizing the few facts known about it, we present the present paper.

The syndrome is characterized by necrotic ulcers of mucous membranes—usually in the mouth—with fever, and other signs of general infection; and is associated with a blood picture, whose outstanding feature is the reduction in the number of granulocytes.

The right of agranulocytic angina to the ranking of a clinical entity is by no means undisputed. Thus, Hueber[18] examined 79 cases of it, and satisfied himself that each one was secondary to some other diseased process. Zikowsky[11] has even reported this picture in some chronic wasting conditions. Feer[8] suggests that agranulocytic angina is merely an element in severe septicemia, and Hoche[7], too, thinks it is but a sign of sepsis. Klein[12] has maintained that if we examined the blood of the moribund we would find the agranulocytic picture frequently.

On the other hand, most writers consider that this syndrome of necrotic ulcers and agranulocytosis comprises a distinct clinical entity. Such was the opinion of Schulz, who was the first to call attention to the condition. Recently, Blumer[15] has expressed the opinion that, while agranulocytosis may occur in other diseases, yet its association with ulcerative mucus patches does establish a disease unit. Consultation with the standard medical text does not clarify this situation, as the disease receives but a few lines in the 1925 edition of Osler[1] and but casual mention in Cecil[2].

Considered etiologically, there are two points of view. Some maintain that the ulcers are primary, permitting invasion of organism

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and subsequent disease of the leukopetic system. Some, on the other hand, feel that a disease of the blood-forming organs constitutes the fundamental disturbance, and that the ulcers are merely the manifestations of the lowered resistance. Bautz[16], Blumer[15] and Zikowsky[11] are supporters of the second theory and would confine their attention to the study of the leukopetic apparatus. Friedman and Paroulek[17] are advocates of the hypothesis that the ulcers are primary. In a study of the smears made from the ulcers, Thomson[10] found staphylococcus aureus, while Kastlin[14] reported hemolytic streptococcus.

In spite of its high death rate, few autopsies are recorded. In many who died, complications confused the pathologic findings. Kastlin[14] found fibrinous pneumonia; Schultz, spinal cord involvement, and Thomson[10], diabetes in cases that they autopsied. Liver and spleen disease has been occasionally found, Sharpe[4] reporting a case with granular degeneration in the liver, while Kastlin[14] has found endothelial hyperplasia in the spleen. The bone marrow has been favorite subject for study, as it can be obtained from the living patient. Schulz found agranulocytosis in this tissue, and Kastlin[14] and Zikowsky[11] have noted the same findings. The latter also emphasized the absence of yellow bone marrow. Feer[8] has even suggested that actual injury to marrow was a probable factor.

The symptom complex is that of an acute infection, with local ulcers and a characteristic blood picture. The order in which they occur has been listed by Feer[8] as: Discomfort, rigor, fever, sore throat, and then ulceration. This is similar to the sequence of events in the cases reported by other observers of this disease. The usual age of onset is early middle life. Klein[12] has tabulated the cases reported and found 46 years as the average age for male patients and 30 years for female. He also believes that the disease tends to attack persons previously in the best of health, but this has been very much disputed. The fever is the type usual to an acute infection. The ulcers may appear on any mucous membrane, but the oral mucosa is their favorite site. They are shallow and tend to bleed and soon become gangrenous. Paroulek[17] reported a case in which the patient had bleeding gums for many years preceding the attack. They do not resemble diphtheritic patches, although Blanton[5] warns against confusing them. Prostration is usually severe but seldom disproportionate. The lymphatic system is often involved, but not as typically as in the leukemias. Lymphadenitis has been commonly observed and papers emphasizing this have been written by Kastlin[14] and Haverkamp[9]. Blanton[5] has reported a case in which the patient

had an enlarged spleen. In the original report of the first case on record, Schulz seemed to feel that jaundice was an important sign. But the more recent studies of agranulocytic angina lay less emphasis on this. Feer[3] and Blanton[5] have had patients with enlarged liver, and Sharpe[4] has found liver pahology at autopsy. Examination of the blood shows a leukopenia with a reduction in the granulocytes. Some, such as Klein[12], feel that the characteristic blood picture is one in which there are no granulocytes at all. In the few cases in which recovery takes place, there is also a return of the blood cytology to normal figures.

The course of this disease is a rapid one, seldom more than a month. Death occurs in from 80 to 90 per cent of the cases. There is a question of possible recurrence in the cured cases, which has been suggested by the patient of Paroulek's[17] who had many attacks of bleeding gums before she finally died of a verified agranulocytic angina. Among the complications, dysphagia is to be expected; Kastlin[14] believes it to be a prominent symptom. Ecchymoses and other suggestions of hemorrhagic diathesis have been emphasized by Blanton[5] and Paroulek[17]. In one case, reported by Thomson[10], diabetes was a complication.

There is no evidence to suggest that agranulocytic angina is a contagious disease. Sharpe[4] reported the case of a sailor who developed this condition, and whose colleagues all suffered from sore throats. None of these, however, developed agranulocytic angina. Another contribution to the epidemology of this condition was made by Kastlin[14], who has found cases developing within hospitals in patients whose blood counts on admission were normal. He believes that the reduced resistance incident to the primary condition was responsible; he definitely denies the possibility of a contagious or epidemic character.

The diagnosis depends on the blood picture, which is to be considered pathognomonic. The disease is to be differentiated from leukemia by the leukopenia seen in agranulocytic angina, as well as by the special lymph system changes noted in leukemia. The patches may be confused with Vincent's angina, syphilis or diphtheria; however, direct smear culture, the therapeutic results and the blood studies should establish the distinction. Aplastic anemia will differentiate itself by the pallor, blood picture, chronicity and tendency to hemorrhage, but the monocytic condition occurs in younger patients; enlargement of the spleen is a more frequent sign; the outcome is early recovery in monocytic angina; while in each case the blood picture is characteristic.

The prognosis is every bad. A review of the cases reported shows that 90 per cent die, although Hueber[18] reports a 20 per cent recovery from his search of the literature. Kastlin[14] thinks fibrinous pleurisy is a common cause of death. Recoveries have been reported by Blanton[5], Hoche [7] and Paroulek[17].

On the theory that exhaustion of the bone marrow is the physiologic basis for agranulocytic angina, blood transfusion has been recommended as a therapeutic agency. Hoche[7] used it in three cases and reports one recovery. Paroulek[17] also reports a recovery in a patient who received blood transfusion. These observers believe that the transfusions should be repeated if necessary.

Many other drugs have been used. Omnadin has been recommended by Hoche[7] and Paroulek[17]. Hueber[8] suggests arsenic compounds will be found useful. Paroulek[17] used arsenic in the form of neoarsphenamin, while Hoche[7], investigating this remedy, concludes that it is without value. Hoche[7] has the same poor opinion of X-ray therapy, although this had been used by Paroulek[17]. A drug called phlogetan has been employed by Zikowsky[11]. The latter has also suggested that streptococcic antiserum or polyvalent serum be used. Serum therapy has received favorable attention by Hueber[8] also. Its advocates believe that the invasion of the mucus plaques by streptococci is an agent in precipitating the disease. But of all these remedies, repeated blood transfusion has been the only one attended by any success.

Summary: Agranulocytic angina is a disease in which gangrenous ulcers appear on mucous membranes, usually in the mouth. The blood picture is characteristic, and consists of a leukopenia with a reduction in the number of granulocytes. In many cases, a blood smear shows no granulocytes at all. It is not known whether the ulcers represent the primary focus through which an organism invades the body, or whether they are merely the product of lowered resistance. In any case, the leukopetic apparatus seems to suffer, and agranulocytosis occurs in the bone marrow, as well as in the bloodstream. The course is like that of a severe infection—rapid and usually fatal. The disease is not contagious. Repeated blood transfusions is the only therapeutic measure which has met with any success.

Because of the tendency of the ulcers to pick out the mucous membrane of the mouth, agranulocytic angina is of especial interest to laryngologists.

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23 Dwight Street.

AN IMPROVED ARMAMENTARIUM FOR TONSILLECTOMY.*

DR. HARRY NEIVERT, New York.

It has become customary of late, when one presents any new tonsil instruments, to begin with an apology for increasing the already formidable equipment at our disposal. From the wording of the title of this paper, one would surmise that I am adding more. On the contrary, I want to offer for your criticism a *few* instruments which will do the work of *many*. For me, they have simplified the technique and made it more accurate and more satisfactory. I, too, then begin with an apology, but my apology is for not having presented them sooner. These instruments have been in use for some time in a very active service at the Manhattan Eye, Ear and Throat Hospital, where they were perfected with the encouragement of my senior, Dr. Arthur S. Wilson, and the chief of the Tonsil Service, Dr. David Jones.

There are four instruments in this group, a knife, a forceps, a snare and a hemostat. The knife (Fig. 1) has two working ends. At one end is a pointed, curved, double-edged sharp blade, the convex edge being serrated by a series of 20 sharp saw teeth beginning one-eighth inch from the point. The points and the edges of the teeth are sharp. This makes the action of this edge like so many scissors, cutting the retrotonsillar fibres between the capsule and fascia covering the muscular bed much quicker than an individual scissors. In order to prevent tearing away pieces of muscle to which scars and tough fibrous bands are attached, the concave sharp edge is used as much as possible, placing the point under them and cutting forward close to capsule. The other end of the knife is curved on the flat at a right angle, one-quarter inch from the tip. This serves as a retractor, and also because its edge and the edges of its shank are beveled rather sharply, it may be used for rapid work, much like the Matthews knife.

The grasping forceps (Fig. 2) is an adaptation of the Bruening and Luc nasal forceps. The rounded, blunt tip makes an ideal tissue forceps and ordinary does not tear through as easily as a pronged forceps. It is also used as a sponge holder. There being no ratchet to lock the handles, the patient's desire to expectorate may be *anticipated*, and the instrument instantaneously withdrawn from the mouth.

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This little maneuver cannot be sufficiently emphasized. It will prevent the patient from becoming "gaggy" and fatigued and he will co-operate better.

The snare (Fig. 3) is patterned after the justly popular Eve's snare, but with two radical improvements. The solid stylet through

Fig. 1.

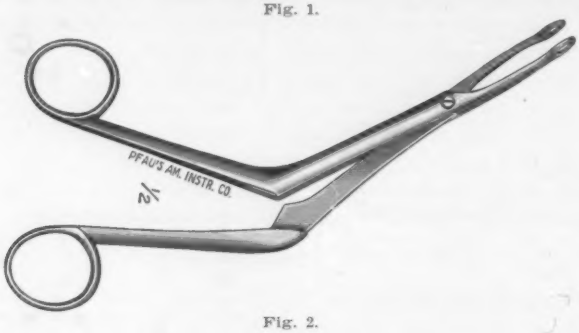

Fig. 2.

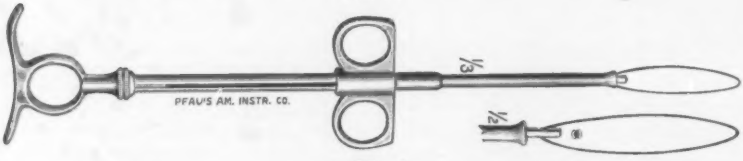

Fig. 3.

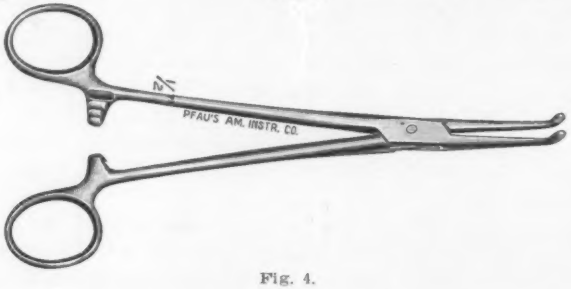

Fig. 4.

which the wire is usually threaded is replaced by a hollow tube. This has, preferably, one hole three-eighths inch from the tip and both wire ends are placed in the hole and are thereby hidden in the tube. There are no sharp ends to puncture the fingers or to get caught inside the barrel of the snare. The wire holder may be adapted to

any type of snare. The other improvement is the method of attachment of the thumb ring. By eliminating the screw, there is no possibility of pinching the skin of the finger or palm between it and the two-ring bar. This thumb ring also swivels, making it more comfortable to use. It may be moved down one-eighth inch if wire is too long to cut through.

The hemostat (Fig. 4) is curved one-quarter inch from the tip at an angle of 33 degrees and has but four serrations, which is ample when used for blood vessel clamping purposes. Just proximal to the serrated tip, there is a slightly roughened area, which is used when the hemostat is employed for ligature-holding purposes. The function of the angle at the tip is to facilitate the clearing of the end of the vessel-grasping hemostat when the slipknot is drawn tight. The slipknot is placed in the concavity of the ligature-holding hemostat, the short end being grasped in the slightly roughened area. The convexity of the upturned tip of the hemostat lies in the concavity of the ligature forceps.

These instruments were primarily designed to simplify and improve the sharp dissection method—so-called capsule splitting technique—under local anesthesia. Without preliminary medication or swabbing with cocain, the retrotonsillar space is injected with 1 per cent novocain and adrenalin. The only instruments the patient sees after this are the knife, the grasping forceps and the snare. Any auxiliary instruments, such as scissors and hemostats, are under a towel.

With the forceps held horizontally in either hand and the knife in the other, each instrument in turn acting as a tongue depressor, depending on what the next step may be, the operation proceeds without the instruments once leaving the hands until the tonsil is dissected completely, or almost completely, and the snare is used to cut through the base. There is no lost time and no false or unnecessary moves. Ambidexterity is a valuable asset and should be cultivated in order that the instruments be handled in the most natural position. In so far as it is possible, an attempt is made to grasp only plica or capsule with very little tonsil tissue, because it appears to be better technique to avoid a massive grasp of tonsil. The hold is frequently changed in order to progressively expose the capsule, so that every fibre is seen before it is cut.

The plica (and adjacent tonsil) is engaged as close to the tongue as possible and traction made toward the median line. This exposes the underlining of the anterior pillar as well as the lymphoid follicles between the faucial tonsil and the lingual tonsil. The incision is begun at the junction of the anterior pillar and the tongue, cutting

out the lymph follicles in the plica at the very beginning but sparing all the mucosa above this area. It will be noticed at the end of the operation that the edge of the anterior pillar is not a raw edge, but has a layer of mucosa reflected under it. With the point of the knife the incision is continued upward and deep enough to really expose the layer of capsule most intimately attached to tonsil. The forceps is then released and while doing so the knife is reversed and the retractor is made to enter the incision and retract the pillar and attached fascia and muscle in order that a new grasp on the capsule be made more laterally. With any of the sharp edges of the knife, or with the teeth, most often with the point, the capsule is further exposed and the tonsil dissected out, leaving it attached at its base and along the entire posterior pillar by a thin layer of mucosa. The reason for keeping the attachment along the posterior pillar intact until the very last is to prevent, as much as possible, any blood going down the pharynx. Most of it drips onto the tongue, where it is easily spat out. With the patient's head inclined slightly forward and the operator seated lower than patient, this is much facilitated.

If the bleeding is sufficient to obscure careful work, a plug of loose cotton is placed into the dissected pocket and packed tightly against the bleeding area. The dissection then proceeds, or work on the other tonsil is begun. At the end of the operation all bleeders are clamped and tied.

Tonsillectomy is a surgical operation which when done by sharp, full-view dissection, without trauma, is safest and gives best results. Other things being equal, as compared with blunt, blind dissection, there is definitely less postoperative pain, quicker healing and comparatively no scarring. When done under local anesthesia there is infinitely less discomfort during operation. The improvements in the snare have made it safe for the operator and nurse to handle. The worry about the wire puncture wounds are gone, as are the painful pinch wounds of the palm. The ease of placing a slipknot on bleeding vessels will put our trust less to luck and more to ties. Finally, the instruments as used here permit a true anatomical dissection, and lift tonsillectomy to the realm of real surgery.

2178 Broadway.

A TECHNIQUE OF ANTROSTOMY.

Dr. R. M. Moose, San Bernardino, Cal.

The creation of an opening into the maxillary sinus through the inferior nasal passage, although originally suggested by John Hunter, was first performed by Mikulicz and Krause[1]. Mikulicz used a right angle stylet and Krause developed this into his cannula and trocar[2]. Since that time it has been of advantage to make a large opening into the sinus by resection of a portion of the antronasal wall, antrostomy or window resection, and for this purpose various instruments and methods of procedure have been devised. The method I

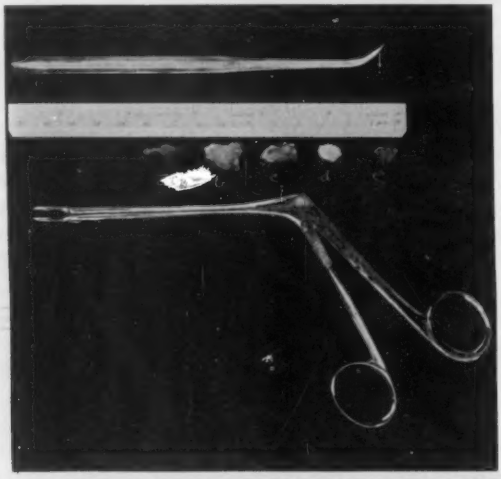

Fig. 1. (a) Portion of antro-lining with polyp. (b, c, e) Common sizes, 1 to 1.5 c.m. across. (d) Linings removed to show shape of average bony partition.

advocate differs from the others not in principle, but in some important point of technique.

As a preliminary, barbitol or morphin and scopolamin is always given. After application of local anesthetic with adrenalin, the inferior turbinate is infracted upward and the curved chisel, as shown in the photograph, is placed toward the front of the inferior meatus and pushed or driven with a few taps into the antrum. The handle

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is then moved up and down, back and forth, in order that the blade of the forceps in the next procedure may the more easily enter the slit made by the chisel. This chisel, 7 m.m. wide, is beveled edge and was originally straight. I had the end of it bent at an angle of about 45 degrees so that it could be made to break into the antrum at a more forward position (Fig. 1).

The forceps used are not cutting or punch forceps, but grasping forceps. They are the Giglio forceps and have special advantages for this work, in that the blades, 6 m.m. wide and fenestrated, are flat, yet strong, and when almost closed are parallel, as they should be for holding firmly the mucous membranes on each side of the bony partition of the antronasal wall (Fig. 1).

When the chisel is withdrawn, the movable blade of the forceps is inserted through the opening into the antrum and after careful manipulation a portion of the antronasal wall, in a posterior direction, is grasped with extreme firmness and then by rotary motion is broken out. This brings forth a large resected specimen with mucous membranes *in situ* and the operation is finished. If there is a tendency to bleeding, ½-inch gauze strips are packed against the points. If the inferior turbinate is of the low type, that was resting against the floor of the nose before being infracted at the beginning of the operation, it should now be resected anteriorly because of its likelihood of rotating again to the floor of the nose and closing the window.

COMMENTS.

1. A large portion of the sinus mucous membrane, together with the nasal mucous membrane on the opposite side of the bony partition is obtained for microscopic and macroscopic study. (See Fig. 1 for study of specimens.)

Such a study would be of aid in considering the indications for a radical procedure.

2. Windows are more apt to stay open, due, I believe, to the fact that the mucous membranes on each side of the bony partition are removed.

3. The interior of the antrum may be inspected by anterior rhinoscopy or with the nasopharyngoscope immediately after the operation, or in most cases at any later date.

4. There is little trauma.

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575 Fifth Street.

International Digest of Current Otolaryngology.

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In *California and Western Medicine* for September, Hara reports the result of bronchoscopic study of 110 tonsillectomy cases for evidence of aspiration. He strongly emphasizes the desirability of operating these patients in the modified Trendelenburg position as a means of preventing aspiration. ROSENBERGER.

Schonfeld and Baumbach, in Strahlentherapie, May 10, 1930, report that during the past three years they have treated 150 children with enlarged tonsils by means of X-ray radiation; these children ranged from three to 13 years of age. Examination a few years after completion of treatment showed that in only about 40 per cent were the tonsils any smaller than they had been before the radiation. On the basis of their experiences the authors believe that Roentgen irradiation of enlarged tonsils is indicated particularly in patients with a history of frequent recurring infections of the pharynx.

Richter, of Erlangen, in the Zeit. f Hals, Nasen u. Ohrenhlk., 26:181, 1930, presents an article on X-ray of the maxillary sinuses, using Uroselectan as a contrasting medium. A 40 per cent watery solution of Uroselectan (Schering-Kahlbaum, Berlin) was used. Tests were made on people with normal, healthy noses, and the X-ray plates showed a fine and sharp contrasting shadow between the bone and the air space. This fine shadow is interpreted as being the mucous membrane and the endosteum. In inflammatory conditions of the antrum, characteristic changes are shown in this intermediate space by atypical filling shadows. The author lays great stress on the value of this procedure in those cases where the washings are negative and where one is suspicious of a chronic hyperplastic maxillary sinusitis. KELEMEN.

Detre, in the Orvosi Hetilap, 1930-650, reports an interesting case of agranulocytosis in a patient who had been under observation for years before the onset of this condition. Previous examination showed that the granulocytopoetic apparatus was always functioning perfectly. The patient was treated with salvarsan and blood transfusions and made a complete recovery. KELEMEN.

Robey and Finland, in the May, 1930, Arch. of Internal Med., discuss the effect of tonsillectomy on an acute attack of rheumatic fever. They state that the operation may be performed during the active stage without harm to the patient. Ether was the anesthetic selected for the majority of the 165 cases of their series. The decision to operate was made by internists, and not by rhinologists. In several cases in which symptoms have repeatedly recurred, the results of the operation have been brilliant.

Giese and Briskman, in *Colorado Medicine* for October, page 374, report their experiences with 500 cases of Vincent's disease. Local treatment consisted in 2 per cent sodium perborate mouth wash and 7 per cent chromic acid solution applied locally. Resistant cases were treated by injections of either or both neoarsphenamin or bismuth. Certain cases were found to yield to bismuth, which were unaffected by neoarsphenamin and *vice versa*. Whereas they found Vincent organisms in practically every mouth, none were found in edentulous mouths. ROSENBERGER.

Turner, Anderson and Loew, of Detroit, in the April, 1930, *Journal of Infectious Diseases*, report on a study of bacteria of the upper respiratory tract and middle ear of Albino rats deprived of Vitamin A. They found that the pyrogenic Gram-negative cocci are encountered more frequently in the animal that shows the most severe symptoms of Vitamin A deficiency. Evidence is given that cod liver oil protects against bacterial invasion of the nasal cavity and middle ear.

Wagner, in the Orvosi Hetilap, 1930, reports on two cases of intracranial complications which, from their septic appearances, were considered to be phlebitis of the jugular bulb. In both cases operation showed there was nothing pathological to be found in or about the bulb. One case was cleared up on the autopsy table when the condition proved to be a case of abdominal typhoid fever. KELEMEN.

Rethi, of Budapest, in the Zeit. f. Hals, Nasen u. Ohrenhlk., 26: 175, 1930, reports on the desensitization treatment of vasomotoric rhinitis. Twenty-seven patients were treated with Cutivaccin Paul; the technique employed was scarification of the skin of the arm. An average of five to seven treatments was given each patient. Rethi reports that 23 of his 27 patients were completely healed and the other four were tremendously improved. KELEMEN.

Kern, of Philadelphia, in the June, 1930, Pennsylvania Medical Record, writes on the relation of chronic paranasal sinus infection to bronchopulmonary diseases. His conclusions are that in the examination of all patients with chronic bronchopulmonary infections, especially those productive of a purulent sputum, there should be a rigid routine examination of the nasal sinuses. If involvement of the sinuses is found to be present, the thorough treatment of that sinus condition becomes the essential part of the treatment of the bronchopulmonary infection.

In the *Texas State Journal of Medicine* for October, 1930, Daily calls attention to the likelihood of error in the diagnosis and treatment of atrophic maxillary sinusitis. He points out that in this condition the sinus membrane, although thin, is diseased, and because of the thinness of the lining membrane, the sinus may transilluminate very well and in the radiograph appear quite normal, thus simulating a normal sinus. ROSENBERGER.

Robey and Finland, of Boston, in the Archives of Internal Medicine for May, 1930, report on the effect of tonsillectomy on an acute attack of rheumatic fever. They claim that tonsillectomy may be performed during the active stage of acute rheumatic fever without harm to the patient. Tonsillectomy at this time offers no more dangers than when performed at what appears to be a more favorable time. Ether was the anesthetic of choice. Bronchial pneumonia and bronchitis were considered contra-indications to operation. Cardiac conditions practically never contra-indicate operation. Patients who have had recurrence under the usual medical treatment and are operated on during the quiescent stage should be told that the tonsillectomy may produce an exacerbation of the joint symptoms, but that it will probably be mild and brief if the operation is a success. The decision in the reported cases was made by internists and not by rhinologists. Robey and Finland base their conclusions on a series of 165 cases.

TEN OTOLOGICAL AXIOMS. By Dr. Samuel J. Kopetzky, New York.

1. The ear drum should only be incised when it is bulging, indicating that there is pus behind it. It should be opened adequately so as to establish proper drainage; and it is better to open it a little late than too early.

2. Reincision of the drum head is rarely—very rarely—necessary. No incision of the drum heals while there is a fluid under pressure behind it. With infants under one year of age, an exception to this rule is possible.

3. Paracentesis, or incision into the drum head, does not prevent mastoiditis. Mastoiditis occurs as often when the drum ruptures spontaneously as when it is incised. One incises the drum because a better after-result is obtained, not to prevent mastoiditis.

4. In infants, examine the whole child before blaming a reddened ear for a rise of temperature. Often the red ear is merely incidental to something else.

5. If possible, take a culture of the bacterial flora present at myringotomy, before secondary local infection has supervened.

6. All cases of otitis media under observation to determine whether or not surgery is indicated should have a Roentgenogram taken and complete serial blood counts made.

7. Every case of purulent otitis with a septic temperature should have a blood culture taken, preferably at the peak of the temperature, where X-ray and physical examination of the mastoids give negative findings and general physical examination is negative. In the face of other negative findings, a positive blood culture, with streptococcus hemolyticus, usually means a primary bulb thrombosis. This organism is responsible for a vast majority of the cases of septic sinus thrombosis encountered in New York.

8. All suppurative ear conditions give a clouding on X-ray examination. The determining factor is the presence or absence of bony cell destruction. No other finding is of significance in determining the presence of a lesion requiring surgery.

9. In all old people, and especially in diabetics, it is better to resort to surgery too early than to delay. These patients are prone to early debility; and surgical intervention should be timed to avoid this.

10. Finally, all cases of mastoidal involvement do not require operation. Under careful observation and competent care, a large number will resolve.

(Reprinted from the Bulletin of O. O. R. L. Society, Kansas City, Oct., 1930.)

BOOK REVIEWS.

Cancer of the Larynx. By Sir St. Clair Thomson, M.D., F.R.C.S., F.R.C.P., Emeritus Professor of Laryngology in Kings' College Hospital, and Lionel Colledge, M.D., F.R.C.S., Surgeon to the Throat Department, St. George's Hospital. London: Kegan Paul, Trench, Trubner & Co., Ltd., Broadway House: 68-74 Carter Lane, E.C. Price 25 shillings, net. 1930.

This new book by Drs. Thomson and Colledge is of prime importance to both the otolaryngologist and the general surgeon. It is written in that wonderfully readable manner for which the authors are well known. The text is full of vitally essential facts and the failure to read and study it by any otolaryngologist or general surgeon is indeed that particular individual's loss.

Thomson and Colledge recognize work done not only in England, but also in America and the rest of the world. Their bibliography is unusually up-to-date and is extremely terse and to the point.

The reference to Dr. Woods' method in the production of the esophageal voice in laryngectomized cases by the use of citric acid and sodium bicarbonate is just one of the many high-points to be found in the reading material of this textbook.

A separate chapter is devoted to operations of Cancer of the Pharynx, Tongue and Epiglottis, in which the operation of choice is that popularized by Trotter. Special attention is given to detail of diagrams, photographs and prints, which together with the excellent bibliography make this work an extremely useful reference book.

The reviewer feels that this is the most erudite and interesting book on this subject that it has been his good fortune to read. E. L. MYERS.

Die Mund- und Halsoperationen. By Prof. Dr. J. Soerensen, Berlin. With 42 illustrations in the text and 48 colored plates. Urban & Schwarzenberg: 105b Friedrichstrasse, Berlin N-24, Germany. 1930. Price Rmks. 95.

The author has compiled a thoroughly complete textbook of the surgical procedures in the mouth and neck. The first portion of the book deals with the technique of local anesthesia and the general pre- and postoperative care of the patient.

The various anatomical parts are taken up in order and operations discussed individually. It is interesting to note that the book still gives a thoroughly detailed account of tonsillotomy.

The major laryngeal conditions are painstakingly described. Neck and thyroid surgery also receive adequate mention.

The text consists of 457 large pages with 42 figures and 48 colored plates. This textbook will be of unquestioned service, not only to the specialist, but also to the general surgeon, insomuch that the majority of the operations described are those which require constant reference. M. F.

Medical and Surgical Year-Book. Physicians' Hospital, of Plattsburgh. Comprising Wednesday afternoon invitation lectures, papers of the Cardiac Round-Table, the First Beaumont Lecture and Collected Papers by the Staff. Wm. H. Miner Foundation, Plattsburgh, N. Y. 1930.

This volume, which is by way of a tribute to William Beaumont, America's pioneer physiologist, comprises round-table conferences and invitation lectures of the Plattsburgh Hospital. In the volume are two sections of interest to otolaryngologists. First, is an article by Arthur S. Wilson on the place of bronchoscopy in the general hospital; and second, a case report on agranulocytic angina, by Irving S. Haynes. M. F.

EASTERN NEW YORK EYE, EAR, NOSE AND THROAT ASSOCIATION.

Meeting of March 19, 1930.

Minutes of the forty-seventh regular meeting of the Eastern New York Eye, Ear, Nose and Throat Association, held at Ellis Hospital, Schenectady, N. Y., March 19, 1930.

The essayist of the evening was Dr. Charles J. Imperatori, of New York, ex-President of the American Bronchoscopic Society; Professor of Laryngology, New York Post-Graduate Medical School and Hospital; Chief of the Bronchoscopic Clinic, Manhattan Eye, Ear and Throat Hospital, etc.

Dr. Imperatori first presented his moving picture demonstration on "Cardiospasm", with informal remarks: Cardiospasm is frequently misdiagnosed. It has often been mistaken for cancer. The first essential for diagnosis is the X-ray; and the second is a verification by esophagoscopy.

Endoscopy does not belong to any one individual; it should be practiced by all laryngologists.

"Foreign bodies" is not the most important division of endoscopy, but "diagnosis" and "treatment" is.

Of the numerous theories on the etiology of cardiospasm, Dr. Imperatori favors Meltzer's, attributing the syndrome to a disturbed neural mechanism of the esophagus, especially of the lower end.

Symptomatology: Subjective sense of discomfort, more or less constant, vaguely referred to the midsternal area or epigastrium or generally referred to the stomach region. Symptoms are aggravated by the eating of apples, beefsteak, popcorn and cold water. The general nutrition may be impaired, but in most cases the patients appear fairly well nourished. Shortness of breath after meals, hiccough and cough are common symptoms. The sense of obstruction to the downward passage of food, eructations with an unpleasant odor and later followed by regurgitation of stale, sour food are most important symptoms.

Diagnosis: Is made by the Roentgenologist. The Roentgenogram shows a characteristic diffuse dilatation of the lower esophagus, with the obstruction at the diaphragm. This is confirmed by endoscopy, which shows a grayish-white pasty mucosa, looking like a furred tongue; the coating cannot be wiped away. At the bottom of the sac, there is a white "floor" of wrinkled esophageal wall. Knowing the required direction, the esophagoscope does not meet resistance at the hiatus, no matter how much spasm may be present. The absence of a growth or infiltration completes the diagnosis. A Mosher ballooning esophagoscope facilitates the diagnosis.

Treatment: A modification of Plummer's method of dilatation, using a combination of the Mosher diagnostic barium bougie and the Plummer hydrostatic dilator with barium suspension instead of plain water. Position of dilatating bag is superintended by fluoroscopy. The pressure is measured by a monometer and controlled by means of a Potain pump. After the bag is properly placed, from six to eight pounds of pressure is maintained from two to five minutes. Three or four treatments usually effect a more or less permanent relief of 60 to 80 per cent of cases.

During and immediately following treatment, a burning pain is felt in the epigastrium, lasting several hours. Usually there will be a great deal of glassy and viscid mucus withdrawn with the bag.

DISCUSSION.

DR. A. C. WORTH: Is any anesthetic used?

DR. H. K. TEBBUTT: Can this method be used for spasm in other locations, such as in other parts of the esophagus? Is cardiospasm always an entity in itself? May it not be secondary to initiation or disease elsewhere in the body, such as pylorospasm, gall bladder disease, associated with liver, heart or lung conditions, circinoma or ulcer of the stomach, etc.?

DR. A. F. HOLDING called attention to the fact that in his experience patients suffering from cardiospasm had been wrongly diagnosed as carcinoma of the stomach because the clinicians had a preconceived notion that the case was one of cancer of the stomach, based on the symptoms occurring in middle-aged adults, associated with epigastric pain, vomiting, loss of weight; they had therefore requested an X-ray examination of the stomach; barium meal for the most part was held in the esophagus by spasm; what little barium trickled through the spasm inadequately filled the stomach, giving a distorted and contracted outline of the stomach, which was erroneously interpreted as a "filling defect" and diagnosed cancer of the stomach. The "filling defect" was due to lack of filling of the stomach, but not due to cancer of the stomach. This mistake could be avoided if Roentgenologists would routinely fluoroscope the chest, esophagus and stomach during the ingestion of the barium meal. In mild cases of cardiospasm, in order to elicit the cardiospasm at the time of X-ray examination, it has been learned at the Mayo Clinic that the plentiful use of grated pineapple in the barium suspension helped to elicit the spasm.

DR. IMPERATORI (closing): No anesthetic is used. I do not regard cardiospasm as a disease; it is merely a symptom. The treatment outlined is simply to be used where indicated for the relief of this troublesome and intractable condition. When it is secondary to definite lesions, appropriate treatment must first be instituted to remove the etiological factor, if that is possible. I believe that dilatation is contra-indicated in carcinoma of the esophagus, also in esophagismus affecting the upper parts of the esophagus.

Dr. Imperatori then demonstrated a new reflex that he had discovered. He called this the "palatopalpebral reflex". It is elicted by touching the soft palate on one side above and to the inner side of the tonsil with a pointed instrument, such as a lead pencil point; this is immediately followed by a reflex closing of the patient's eyes. It is absent in those conditions which affect the soft palate.

After the closing remarks on the subject of "Cardiospasm", Dr. Imperatori then presented his second paper, "Radiopaque Foreign Bodies in the Lung", showing the characteristic Roentgenograms of the chest in cases suffering from radiopaque foreign bodies, bringing out the point that if the foreign body plugged the bronchus, there was an atalectasis (dark shadow of "drowned lung"); that if the foreign body did not plug the brunchus, but only partially blocked it, a ball valve effect was produced so that air entered the obstructed bronchus on inspiration, but on expiration the foreign body plugged the bronchus (became seated) and consequently in such a lung the alveoli were overdistended with air (lighter shadow of emphysema). The diaphragm was also flattened on the involved side. The Roentgenograms must be made in full expiration.

All children who are ailing should be X-ray from head to ischia. By doing this, many supposed cases of tuberculosis, chronic bronchitis, asthma, etc., would be found to be suffering from unsuspected foreign bodies, which might be radiopaque as well as radiovisible.

In certain cases of foreign bodies, the combination of fluoroscopy with endoscopy was invaluable. This valuable contribution has been perfected by Dr. Jackson and Dr. Manges, using fluoroscopy in two planes.

DR. J. M. DUNN: Are there any clinical signs that would help the clinician to make a diagnosis in these cases, especially when he is so unfortunate as not to be able to get an X-ray examination immediately?

DR. E. A. STAPLETON: Have magnets been of any use in the removal of foreign bodies from the lungs?

DR. J. J. O'BRIEN: As contributory evidence of the limitations of electromagnets in this field, I wish to state that one electromagnetic crane that can lift five tons of scrap iron when in actual contact with it, can't left any iron at all if six inches of air intervenes between the face of the magnet and the iron.

DR. A. F. HOLDING: I congratulate the Association and compliment Dr. Imperatori on the soundness of all his statements, advice and conclusions. As an humble local bronchoscopist, of course, the most I can hope to do is to cry, "Me, too!" to the accomplishments of such noted experts as Dr. Imperatori and Dr. Chevalier Jackson. In this connection I wish to call attention to an exhibition in the room of various instances of successful bronchoscopic work done by local men. Among them is a case of my own, in which a hat pin, 6⅝ inches long, was successfully removed from the stomach and esophagus of an 18 months old infant, measuring only 20 inches over all. This illustrates the wisdom of using good surgical judgment and sometimes removing a foreign body by gastrostomy or tracheotomy, instead of yielding to our endoscopic enthusiasm and doing a poorer job by endoscopy. The child made a perfect recovery. Any attempt to remove the foreign body by esophagoscopy was contra-indicated, because the point of the pin had punctured into the lung and was surrounded by hemorrhage.

Inasmuch as the essayist has spoken so favorably of the ingenious combination of bronchoscopy and fluoroscopy, my egotism may be pardoned if I call attention to the fact that the first time this combination was used at an actual bronchoscopic operation was at the Memorial Hospital in New York City, where I darkened the operating room and rigged up an X-ray tube under a wooden operating table in a case in which I collaborated with Dr. Chevalier Jackson, Dr. Henry Janeway, Dr. Harmon Smith and Dr. Sidney Yankauer, and even then we failed to get the foreign body. Dr. Jackson cites this case in his book, "Peroral Endoscopy and laryngeal Surgery", page 327, as one of his unsuccessful cases; up to that time (1914) he had only five unsuccessful cases.

DR. IMPERATORI (closing): Dr. Jackson describes three clinical signs of foreign body in the chest that can be observed independent of the X-ray: 1. Asthmatoid wheeze (audible; 2. tracheal thud (palpable and audible); 3. auditory slap (palpable and audible).

Magnetic bronchoscopic removals of foreign bodies from the chest are, as a rule, "flat failures".

In my experience, good surgical judgment, as shown in Dr. Holding's case, should always accompany and sometimes supersede endoscopic procedures. For instance, from my experience in handling cases presenting the clinical sign of "tracheal thud" (having a movable foreign body traveling up and down the trachea with each expiration and inspiration), I believe it is better surgery to do a tracheotomy and attempt removal this way than to attempt to catch the moving body through an endoscope, "on the fly" as it were.

Dr. Arthur F. Holding, Secretary.